DVT10T2

Thunderbolt™ and eSATA6G / USB3

[User Manual]

Version 1.0

Safety Warning

In order to avoid injury oneself, please heed the following instructions.

■ The following indications explain the degree of physical danger possible by ignoring the proper usage directions.

WARNING	This symbol and waning is used to indicate sections that may result in a serious injury or even death.
CAUTION	This symbol and caution is used to indicate sections that only pose a risk of minor injury or physical damage.

■ The various types of warning symbols are listed in the following picture.

	This symbol means that you should pay extra caution.
	This symbol indicates something you absolutely must not do.
	This symbol indicates something you must do.

Precautions

This user manual contains features, functions, setup, and warnings, so please read this manual prior to use our product.

- If any material in this manual is not clear, please contact vender whom you purchased the unit from.
- The information in this manual is subject to change without prior notice.
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Chapter 1. Outline

Features

- Support up to 10 Hot-Swappable SATA HDD (Hard Disk Drive)
- Support different RAID modes including RAID 6, RAID 5, RAID 3, RAID 1, RAID 0, RAID10
- Alternative host Interface: Thunderbolt 2.0(x2 port) eSATA3 (6Gbps) and USB 3.0 (5Gbps)
- Original FPGA RAID 6 Engine with real time parity generation and high speed DMA switching
- Spot error recovery greatly reduces HDD error and rebuild probability
- Automatic Rebuild at adjustable Rebuild Rate
- LCD and keypad operation for status monitoring and system configuration
- Web GUI status monitoring and system configuration

Functions

- Disk volume can possibly be accessed via different interface, Thunderbolt, eSATA or USB3
- Support two LUNs under eSATA and USB configuration or single LUN for Thunderbolt
- Configurable Write Cache Mode
- Data Read Ahead Size
- Write Retry Mode
- Buffer Segment Size Adjustment
- Multiple Sequential Streams List Size
- Time out Interval for Low Speed Drive Detection
- Drive Ready Waiting Time
- Cache Memory Check Interval
- HDD Patrol Time and Mode

＜Auxiliary Functions＞

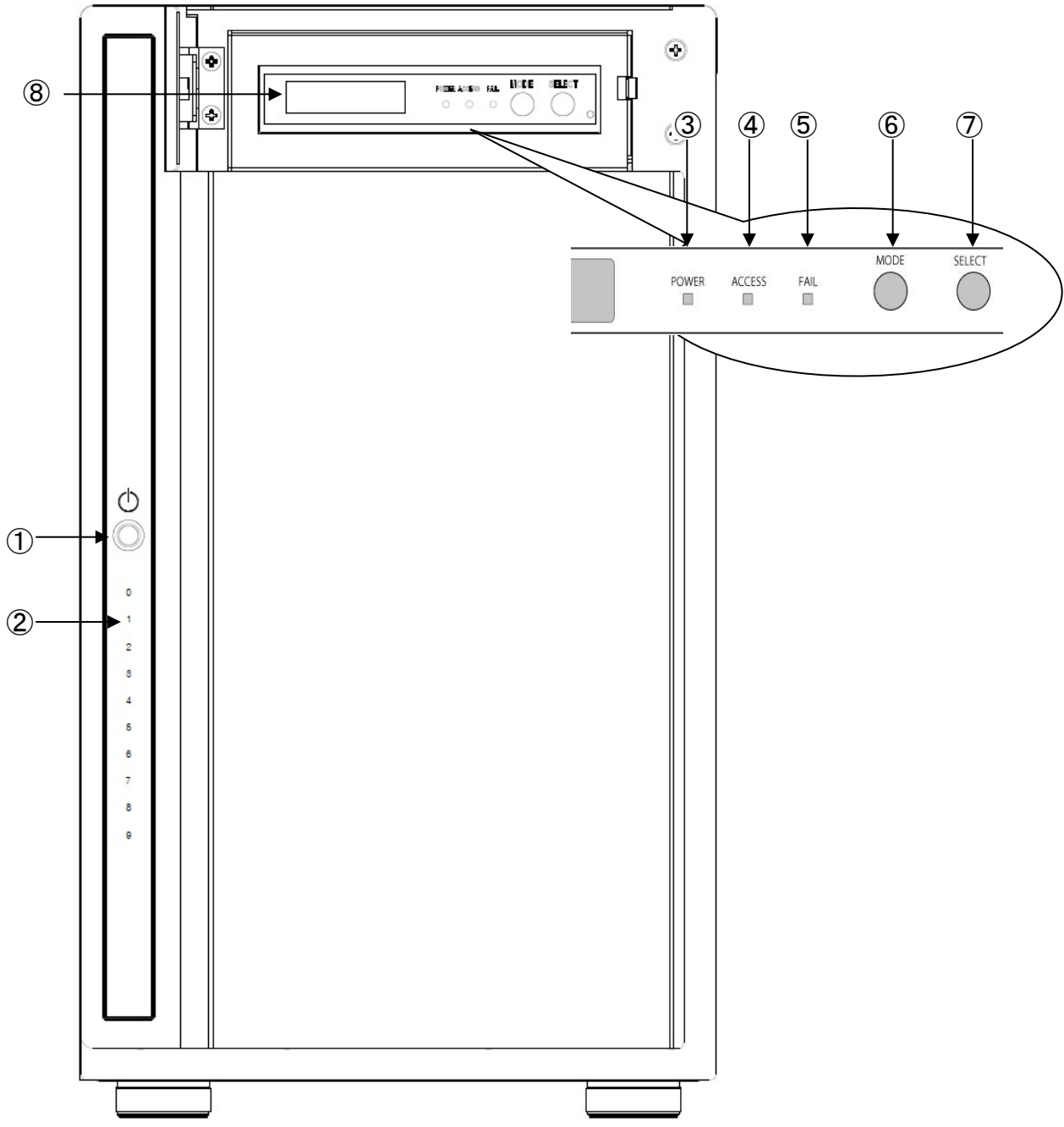
- Data Transfer Speed Display on LCD (Each drive and host channel speed)
- Event Display on LCD, Buzzer Alarm
- Fault LED Indication for Drive and Controller
- Email Notification Support
- Web-based Status Monitor
- SNMP notification

Packing Contents

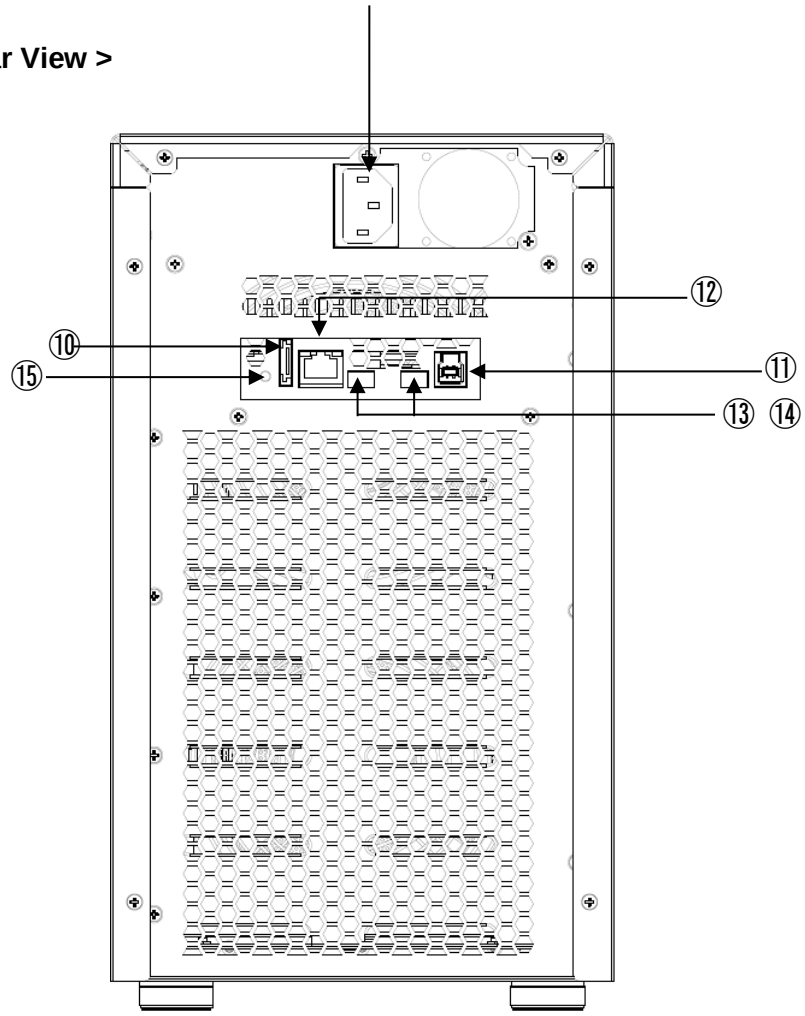
DVT10B3: Storage system
AC Power Cord
USB3 Cable: 1 meter, Type A to Type B
Thunderbolt Cable: 1.5 meter
Screws: 50 pcs of screws and Quick Installation Guide
CD : User manual (User manual, quick installation guide)

Hardware Components

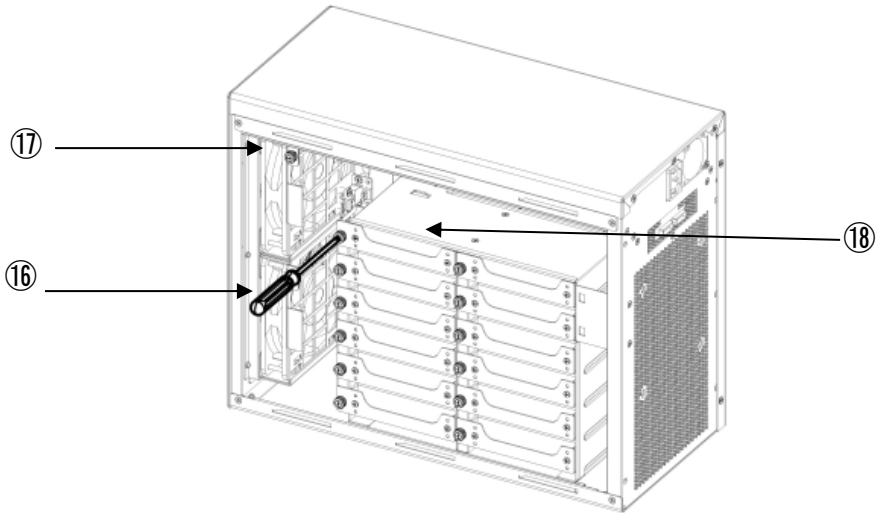
< Front View>



< Rear View >



< Side View >



No.	Name	Function Explanation
①	POWER Button	Power ON /OFF Switch
②	HDD Access / FAIL Bi-color LED	Blue On: Drive asserted, Flash upon access; Red ON: indicates an error When「RAID-x RECOVERING 0%」shown on LCD, the FAIL LED on means the HDD is under rebuilding
③	POWER LED	Blue:Power ON LED indicator
④	ACCESS LED	Green:Controller Access LED indicator
⑤	FAIL LED	Red: A controller error LED indicator
⑥	MODE Button	1）Parameter Initialization(Power on Initialization) 2）Configure parameters「See Chapter 2」 3）Stop buzzer alarm(Buzzer stopped immediately by pushing one time)
⑦	SELECT Button	Setup Parameter
⑧	LCD Display	Message display screen. Show status of the system and parameters while doing configuration
⑨	Power Input	AC Inlet (100V-220V auto switching)
⑩	eSATA3 Connector	eSATA 6G host connector
⑪	USB3 Connector	USB3 host connector (Type B)
⑫	Ethernet Port	RJ45 Fast Ethernet port for Web GUI management
⑬	Thunderbolt Connector	Thunderbolt 2 for host or cascade
⑭	Thunderbolt Connector	Thunderbolt 2 for host or cascade
⑮	Init Button	Reserved rear Button for Initialization
⑯	Fan Module	Fan 1
⑰	Fan Module	Fan 2
⑱	Drive Module	Disk Drive module 0 (to 9).Upper left one is number 0, and right is 1

- **USB3 cannot be enabled while Thunderbolt is enabled(Default)**
- **To use USB3 and eSATA, Host should be set to eSATA**
- **The right usage of Thunderbolt device allows only one connection to host and the other port is used for cascade**

Connection

＜ Beginning of configuration＞

Please go through the quick installation guide to configure the device if necessary. Most of devices should have disk drives inserted and pre-configured with its default setting. The default configuration of the device is Thunderbolt host with full LUN size under RAID 6 protection.

＜ Steps for host connection＞

1. **Thunderbolt connection (Default)**

Default host connection is Thunderbolt. While Thunderbolt is enabled, both eSATA and USB3 ports are forced to disable state. (Default operation might be varied per request from vendors)

The following Mac models are Thunderbolt 2 capable:

- MacBook Pro (Retina, Late 2013 and later)
- Mac Pro (Late 2013)
- iMac (Retina 5K, 27-inch, Late 2014)
- Mac mini (Late 2014)

Mac Computers (Mac OS® X v10.9.x or above) are certified.
Windows 8.1 hosts might be applicable but not certified as our official support.
Only one LUN is visible to host for Thunderbolt connection.
Any of two Thunderbolt ports can be used as host or cascade.

① Simply connect Thunderbolt cable from host to the Thunderbolt port of storage device.

② Power on the storage device before turning on host system. In case, the device was not properly configured, then an alarm might be turned on. Turn off the device and turn it on again while pressing Mode button. Release the Mode button to see if LCD showed RAID Normal.

③ The pre-configured LUN drive should be identified and popped up on your host Desktop screen for first time without partition. If not, you might need to check if the device Thunderbolt was chosen as the host interface or not. You can also check if any Thunderbolt device was attached on Mac system. Please refer to Chapter 3.3 for volume partition on Mac operating system.

④ To change host configuration, web-based management is recommended. Please read Chapter 2 for necessary instructions.

2. USB3/eSATA dual connection

First, please make sure eSATA was configured as Host interface in device parameter. Default is disabled. Please read Chapter 2 about how to change the host configuration. Most of operating systems should work with eSATA and/or USB3 host without having to install any driver. For hosts with UASP supported on USB3, we strongly recommend you to enable it for higher performance. eSATA is supported by OS inbox AHCI driver.

Window 8 or later supports UASP on native Intel USB3 port.
Mac OS® X v10.7 or later supports UASP on its USB3 ports.

USB3 can be enabled or disabled only host mode is set to eSATA. If host mode is set to Thunderbolt, USB3 will be forced to disable state no matter parameter selected. The storage device supports division of the configured disk capacity into single or two LUNs by LUN Mode and LUN Size parameters. The details explanation and configuration can be found on Section 2.3

Case 1: Single LUN connection (default, LUN Mode: Direct no bias, LUN Size: Full**)**

① Simply connect host eSATA* or USB3 cable (if enabled) from host to the associated port of storage device. (USB3 cable is included but no eSATA cable inside the package)

② Power on the storage device before turning on host system. In case, the device was not properly configured, then an alarm might be turned on. Turn off the device and turn it on again while pressing Mode button. Release the Mode button to see if LCD showed RAID Normal.

③ Host system should be able to detect the disk immediately. Sometimes due to the delay of hard disk initialization, you might need to rescan the device to see if the device shown later. If you still could not find the connected device, you might try to re-insert the eSATA or USB3 cable on device or host. Please refer to Chapter 3 for volume partition on different operating systems.

④ To change host configuration, web-based management is recommended. Please read Chapter 2 for necessary instructions.

*eSATA is treated as a SATA disk and can therefore be connected to SAS HBA, too.

Case 2: Dual LUNs connection – eSATA and USB 3 (LUN Mode: Swap no bias, LUN Size: 64GB+All)

① Simply connect both eSATA* and USB3 cables from host to the associated port of storage device

② Power on the storage device before turning on host system. In case, the device was not properly configured, then an alarm might be turned on. Turn off the device and turn it on again while pressing Mode button. Release the Mode button to see if LCD showed RAID Normal.

③ Host system should be able to detect two disks immediately, one as ATA device and the other as USB device. If not, be sure to make sure parameter “LUN Mode” set as “Swap no bias”. For example LUN Size is set to “64GB+ALL”, eSATA disk size will be 64GB and the rest of capacity will be mapped to USB3 disk.

④ To change host configuration, web-based management is recommended. Please read Chapter 2 for necessary instructions.

- **Do not connect both USB3 and eSATA to the host at the same time while LUN Mode is set to “Direct no bias”. This would cause disk data corruption even it might not happen immediately.**

Chapter 2. Setup and Monitor

2.1 Operation Overview

To simplify the process of setup, DVPro is designed to support all of setup options from front panel LCD and button operation. The default RAID level is RAID6 for highest reliability. To prevent malfunction, parameters cannot be changed at normal **Monitor** mode. The device needs to be in **Parameter Setup** mode (Setup mode here after) to change parameters. The device works as its normal state at Monitor mode while any error or status changed being monitored and dynamically reflected to its error indicative functions such as LED light, buzzer alarm etc. Only if you wanted to change parameter setting, should anyone choose to boot up the unit into Setup mode. A device reboot is required for mode change to avoid mis-operate on front panel.

Critical parameters include number of drive, disk size, and RAID mode should have been pre-configured with hard drives installed. If not, you will need to properly configure the critical parameters before the device can operate normally. Default parameters, if any, are followed with "*" sign. Front LCD panel acts as a short path for configuring the device yet Web GUI is more convenient and always recommended to be used.

2.2 Introduction of Parameters Setup

This section explains the general parameters setup process.

To start with new configuration, the system has to be in **Setup** mode. Use one hand to press and hold both "Mode" and "Select" buttons another hand to turn on the device. The LCD should show message as below indicating the system in Setup mode. (The hold time of Mode and Select buttons is about 2 seconds; also the **Init** button at rear panel can be used to replace Mode and Select buttons)

ARRAY PARAMETERS SETTING !

You can then start to modify each parameter under this mode.
General usage of Buttons:

MODE Button: To rotate among Parameter items
SELECT Button: Select the parameter for change

- ●Enter Parameters Setting mode : MODE Button ＋ SELECT Button + Power On
- ●Rotate among Setup items : MODE Button
- ●Setup parameters : SELECT Button

After any parameter modified, **press both MODE and SELECT button at the same to save the change**. New configuration will be effective at next power on.

When you successfully save the change of parameters, you will see LCD show

POWER DOWN PLEASE !

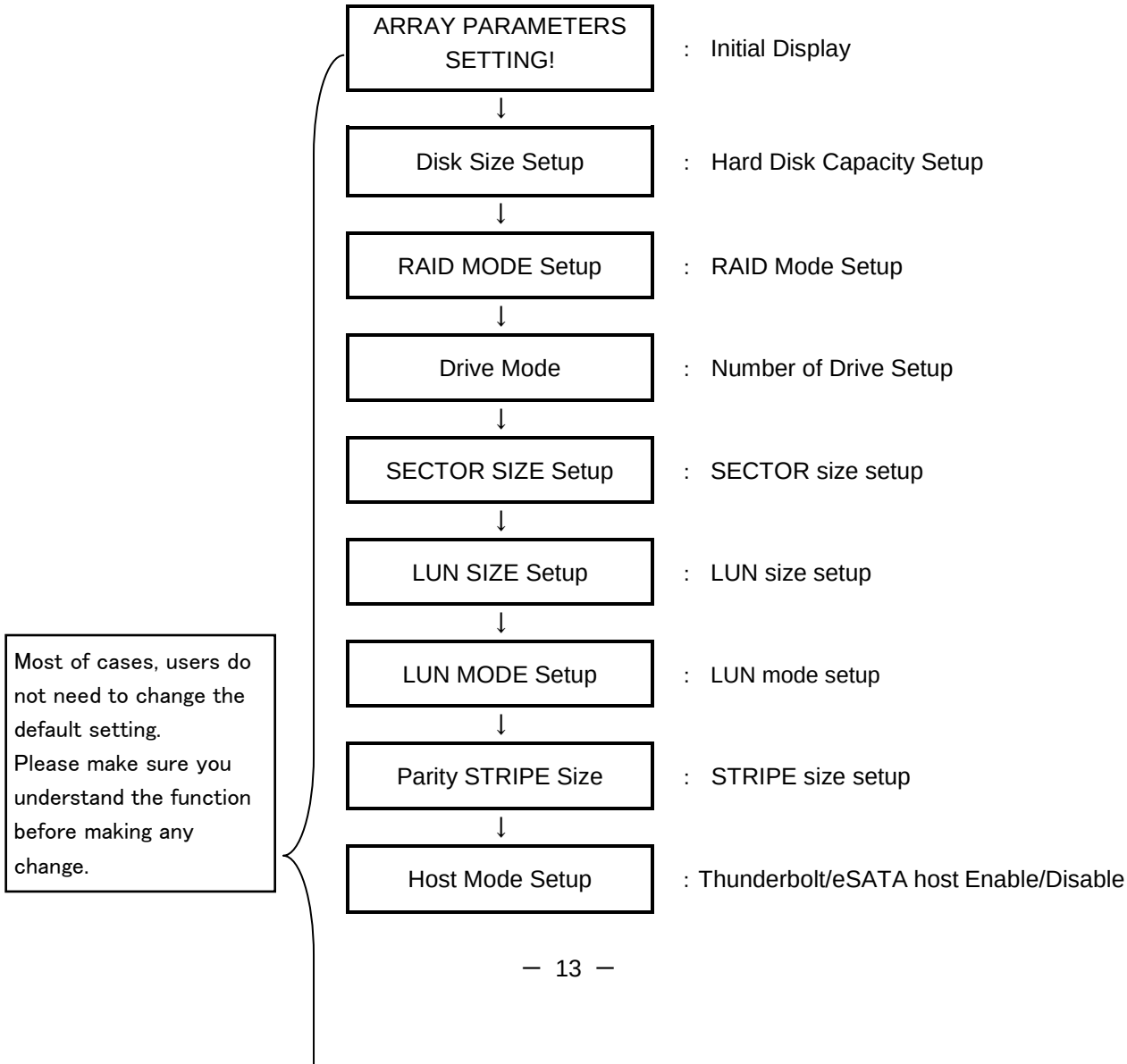
You can then shutdown and turn the device on again.
If you power down before saving operation, none of parameters will be changed.

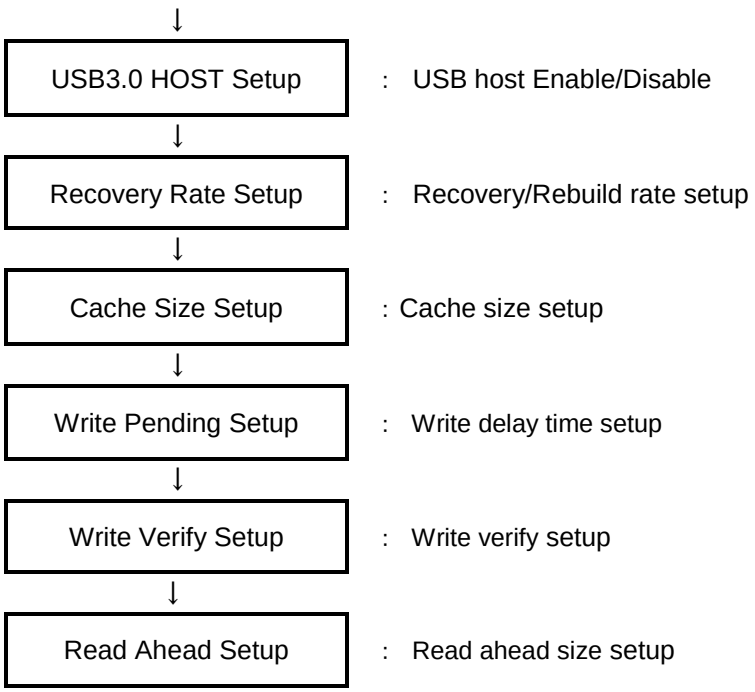
- Saving the change ① MODE ＋ SELECT Button (Save)
  ② Shutdown and power on
- Cancel the change Power off while doing change

If any of Critical Parameters was changed, hold down the Mode button at first power on at the same time for system initialization. (This action will set the device to its normal status and abandon recovery status if any.) After power on, LCD should show its RAID mode and “Normal” status.

RAID-6 NORMAL

2.3 Front Panel LCD Toggle rolling setup flowchart


ARRAY PARAMETERS SETTING!
: Initial Display
Disk Size Setup
: Hard Disk Capacity Setup
RAID MODE Setup
: RAID Mode Setup
Drive Mode
: Number of Drive Setup
SECTOR SIZE Setup
: SECTOR size setup
LUN SIZE Setup
: LUN size setup
LUN MODE Setup
: LUN mode setup
Parity STRIPE Size
: STRIPE size setup
Host Mode Setup
: Thunderbolt/eSATA host Enable/Disable
Most of cases, users do not need to change the default setting.
Please make sure you understand the function before making any change.



2.4 RAID Operational Parameters

This section explains each RAID parameter and the associated function of purchased device.

Ps. please take a memo if you changed parameters different from its default value. You can follow the method described on「Parameter Confirmation」section to read its value.

- **Disk Size Setup**

This is to specify the capacity of the drive you want to use. The size will be applied to all drives. (Usually the system was configured with exact drive size of inserted disks. You should not change the drive size unless you want to reconfigure and change it.） A bigger drive size than supported listing will be added in future firmware upgrade. Please check with vendor you purchased for new firmware.

Parameter	Function	Memo
Test 1GB	Set DISK Size as 1GB (Test only)	
120GB, 160GB, 250GB, 400GB, 500GB, 750GB, 1TB, 2TB, 3TB, 4TB, 5TB, 6TB, 7TB, 8TB	Set Disk Size as	

⚠ CAUTION

⚠ **● Please do not change the default setting**

If actual drive size was smaller than setup value, error such as「ONE DOWN L」,「SYSTEM DOWN L」might happen and buzzer will be fired.

- **RAID Mode Setup**

RAID MODE
RAID-6

RAID mode selection, supported RAID MODEs are
RAID 6, RAID 5, RAID 3, RAID 1, RAID 0, RAID 0 Two Drive, RAID 1 Three Drive, RAID 10, Single Drive
RAID 1 Three Drive means same data is written to HDD0, 1, 2 and read might be from any drive.
RAID10 works as a pair of 'Drive 0, 1' 'Drive 2, 3', 'Drive 4, 5' etc.

- **Drive Mode Setup**

DRIVE MODE
10

Setup number of drives for use in the device. While minimum number is 3 in the list, Single Drive and RAID 0 Two Drive will automatically use first one and two drive respectively despite of Drive Mode number.

Parameter	Function	Memo
DRIVE MODE 3	3 Disks（DATA＋PARITY）Mode	
DRIVE MODE 4	4 Disks（DATA＋PARITY）Mode	
DRIVE MODE 5	5 Disks（DATA＋PARITY）Mode	
DRIVE MODE 6	6 Disks（DATA＋PARITY）Mode	
DRIVE MODE 7	7 Disks（DATA＋PARITY）Mode	
DRIVE MODE 8	8 Disks（DATA＋PARITY）Mode	
DRIVE MODE 9	9 Disks（DATA＋PARITY）Mode	
DRIVE MODE 10	10 Disks（DATA＋PARITY）Mode	Default

- **Sector Size Setup**

SECTOR SIZE
512B

512B, 4KB

This is to setup sector size of disk. For new *Advanced Format* HDD, you need to set up 4KB for better performance on sequential Write access. Please check with your drive vendor for the sector size. Please be careful that Sector size change will result in data lost. Disk format is necessary if sector size change.

- **LUN Size Setup**

LUN SIZE
Max 2TB

Parameter	Function	Memo
LUN SIZE FULL	Configure all capacities to Single LUN size. Depend on host operating system, LUN over 2TB size might not be recognized.	
LUN SIZE MAX 2TB	One LUN only and size is set to 2TB as some Operating systems only support less than 2TB LUN size	
LUN SIZE 1/2 DIVISION	Two LUNs each with half of total capacities will be assigned	
LUN SIZE 64GB + ALL 64GB + Max2TB	Set up one LUN as 64GB and the rest of all as 2nd LUN (or 2nd LUN maximum is 2TB.)	
LUN SIZE 256GB+ALL 1TB+ALL 2TB+ALL	Set up one LUN as 256GB, 1TB or 2TB and the rest of all capacities as 2nd LUN	

Note: For LUN mapping to host port, please refer to LUN MODE parameter for details.
Under Thunderbolt Enable mode, only first LUN will be mapped to Thunderbolt host.

- **LUN MODE Setup**

LUN DIRECT No BIAS

Parameter	Function	Memo
LUN DIRECT No BIAS	LUN Direct :Divided LUNs will be mapped to all enabled hosts	Default
LUN SWAPPED No BIAS	LUN SWAPPED: First host will be mapped to eSATA and 2nd LUN will be mapped to USB3. Under Thunderbolt Enable mode, only first LUN will be visible to host even two LUNs configured.	
LUN DIRECT for MBR(-1)	※Please refer to below explanation	
LUN SWAPPED for MBR(-1)	※Please refer to below explanation	
LUN DIRECT for MBR(+1)	※Please refer to below explanation	
LUN SWAPPED for MBR(+1)	※Please refer to below explanation	

※Sector management of RAID are different between [NO BIAS] and [for MBR(-1) or (+1)]

Depend on host OS used, the begging sector address of disk partition is different. And the setting might affect the performance. The setting should not be changed during operation and disk Format is necessary if changed. Please refer to MBR related information in Appendix A.

- **Parity Stripe Width Setup**

PARITY STRIPE 2 MB/DRIVE

Choose stripe width of RAID-5/6 LUN

Parameter	Function	Memo
PARITY STRIPE 2 MB/DRIVE 1MB/DRIVE 256KB/DRIVE 128KB/DRIVE	Setup stripe width of each drive channel. When the host issues a command, and the parity is to be written, the command is divided up into two or more operations.A relatively big stripe width is setup to reduce the overhead of continuous operation. The bigger size of stripe width, faster transfer speed can be achieved for sequential read or write. Usually「2MB/ DRIVE」setup will give a good performance but it depends on the host application.	Default 2 MB/DRIVE

- **Setup of Host Mode**

Host Mode Thunderbolt2

Parameter	Function	Memo
Thunderbolt2※	Enable Thunderbolt Host Channel	Default
eSATA Host Enabled	Enable eSATA Host Channel	
eSATA Host Disabled	Disable eSATA Host Channel	

※While Thunderbol2 is enabled, both eSATA and USB3 hosts will be forced to Disable no matter how they were configured. Choose eSATA Host Disable or Enable implying disable Thunderbolt Hosts.

- **Setup of USB3 Host**

USB3 Host Disabled

Parameter	Function	Memo
USB3 Host Enabled	Enable USB3 Host Channel	

USB3 Host Disabled	Disable USB3 Host Channel	Default

※When both eSATA3 and USB3 hosts are enabled; make sure LUN MODE set to “Swapped” if you want to map eSATA and USB3 to different LUNs.

- **Recovery Rate Setup**

RECOVER RATE 5Min. /GB

Recovery (Rebuild) operations utilize free time between host data access without interrupting the current host application.
Therefore data read/write priority can be adjusted through different recovery rate setting.
User can choose the timing to execute recovery operations as below.

Parameter	Function	Memo
RECOVER WAIT TIME 0 Sec	Recovery request will be processed immediately between host commands. Recovery will always be processed therefore host access will be slow down. Select this mode if you want the recovery have high priority.	
RECOVER WAIT TIME 0.1 Sec	Continuous host commands will be processed first. Recovery operation will be taken care when the interval between host commands longer than 0.1 sec. The following host command has to wait till one recovery task completed except READ/WRITE or READ Cache command which will be executed immediately.	
RECOVER WAIT TIME 1 Sec	This can be used when host access are not concentrated. The wait interval following the last host command is 1 sec. On this mode, the recovery operation will not be processed if the host commands are continuous with less than 1 sec internal.	
RECOVER WAIT TIME 10 Sec	Usually this should not be used. Probably this mode can be applied if there is very little host access.	
RECOVER RATE 2Min./GB 5Min./GB 10Min./GB 20Min./GB	This is to assign the recovery time for 1GB capacity despite of interval to wait between host commands. **There is possibility 1GB recovery cannot be completed within assigned interval.**	Default 5Min./GB

- **Cache Size Setup**

CACHE SIZE 1GB

This parameter is only for DEBUG usage. Users should NOT alter this setting.

Parameter	Function	Memo
CACHE SIZE 64MB 1GB	「Cache Buffer Error」will be shown if the selected cache size not matched the installed cache memory	Default 1GB

64MB is only for test purpose and should not be used in normal operation.

- **Write Cache Mode setup**

WRITE ALL PENDING 0.1Sec

The controller needs more time than writing to single drive to generate parity while doing RAID-3/5/6 WRITE. Therefore Write Cache is enabled in such situation.
This parameter defines the timing of flushing cache contents into disks.

Parameter	Function	Memo
WRITE MODE WAITING	Under this setting, the Write operation will not be acknowledged as “Completed” till data is written into disks. This means no caching is used during data write. The performance is slower compared to 「WRITE MODE PENDING」mode. READ speed is not affected.	**Write Through**
WRITE MODE BUFFERD	Write command is acknowledged as “Completed” right after data written into cache, and cached data starts to be moved into disks at the same time.	**Write Back**
WRITE MODE PENDING 0.1Sec	After caching the first host WRITE, the cache content will only be flushed into disk if there is more than 0.1 sec host idle or cache threshold is met. When doing sequential writes, cache will be filled by multiple write command and data can be written once to save total write time.	**Default**
WRITE MODE PENDING 1 Sec	Similar to PENDING 0.1 sec, the wait interval is one second.	

- **Verify Mode Setup**

VERIFY WAIT READ aft WRITE

Verify Mode allows you to setup the action for ATA WRITE VERIFY command. “No Verify” will take ‘WRITE VERIFY’ command as a simple ‘WRITE’ without waiting verification to be completed.
Upon READ request after a WRITE command, “NO READ aft WRITE”, means to use cached content to respond a READ command after WRITE. “READ aft WRITE” means cache data was discarded and controller has to read data from disk

Parameter	Function	Memo
VERIFY WAITRead aft Write	The Write Verify command cannot be completed at the time data written into cache. It has to wait till Verification completed. And the written data in cache will be discarded. The data will be read	

	from the disk when a read request comes in.	
VERIFY NO READ aft WRT	The Write Verify command is returned as completion at the time data written into cache. It does not wait till Verification completed. And use the written data in cache for following READ command usage.	Default
NO VERIFY Read aft Write	Write Verify command is treated as Write without verification. And the written data in cache will be discarded. The data will be read from the disk when a read request comes in.	
NO VERIFY NO READ aft WRITE	Write Verify command is treated as Write without verification. And use the written data in cache for following READ command usage.	

- **Read Ahead Setup**

READ AHEAD 64 KB

This is to set size of data to prefetch into cache for read operation.

Parameter	Function	Memo
READ AHEAD 0 KB	Do not do read ahead. You might like to use this setting if read data is frequently changed across different directories	
READ AHEAD 8 KB	The read ahead size is 8KB, i.e one page same as buffer segment size.This might be effective for general random operation.	
READ AHEAD 64 KB	This will read ahead multiple pages following the current one.シー This is effective for general sequential read.	Default
READ AHEAD 256 KB	Compared to 64KB, one more page or 256KB will be prefetched depend on page size. This is effective for sequential access especially video data.	
READ AHEAD 1 MB	1MB or multiple page read ahead depend on page size. It will be effective if the data size is times of MBs.	
READ AHEAD 4 MB	4MB size read ahead. This might be effective if the application read directly block data without through file system.	

2.5 Product Information and Background Parameters

IP address of GUI, Fan speed control and other details for the system are called **Background parameters** on the contrast to RAID operational parameters described in section 2.4

You can change these parameters as described below from LCD operation panel.

Web UI is usually recommended for such requirement if accessible.

ps）Please take a memo before you apply to change the default setting. Default setting is always recommended unless there is special requirement for the change.

2.5.1 Method to setup background parameters

Please make sure you understand exactly the purpose that you are changing from the default parameters. Product information will be shown first while you go through background parameter setting.

1. Press both Mode and Select buttons, power up to enter **Setting** mode.

ARRAY PARAMETERS SETTING!

2. Press the SELECT button (instead of MODE to set up RAID operational parameters)

Firm ware is Ver.x.xxx	Firmware version will be displayed

3. Press the SELECT button

Vender ID is BIOS	Vendor ID will be displayed

4. Press the SELECT button

Product ID is xxxxxxxxxxx	Product ID will be displayed

5. Press the SELECT button

Serial No ID Xxxxxxxx	Serial number of the controller will be displayed

6. Press the SELECT button

End of Fixed Parameter	Indicate the end of the fixed parameters.

Then, if you press the Mode button now, you will enter Background Parameter mode.
You can also get into Background Mode by pressing the Mode button during display on Firmware Version, Vendor ID, Device ID, or Serial Number.

From here, pressing the Mode button to roll among the background parameters.

● IP Address Setup

IP Address 192.168.50.210

By pushing SELECT button, the IP Address will be increased.
The longer you hold the SELECT button, the faster the number is increased.
Push the MODE button to move to next field. (Again Management GUI is recommended)

● Address Mask Setup

Address Mask 255.255.255.0

This is to setup IP address mask same as IP setup.

● Parity Mode Setup

ENABLE PARITY	ENABLE*、DISABLE

Enable or Disable Cache memory parity. (Similar to ECC function)

● Maximum negotiable speed of host channels

eSATA Host Speed 6Gb/s	3Gb/s, 6Gb/s*

It is important to note that the device eSATA speed is not auto-negotiable. Most of eSATA rate of host computer is auto-negotiable, so this parameter has to be equal or smaller than the eSATA rate of host computer.

●NCQ MODE

NCQ MODE NO QUEUING	NO Priority, NO Queuing, Read Priority*, NO Reorder

Set up NCQ (Native Command Queue) support, default is READ Priority. Options are listed as below

NO QUEUING *: No Queuing
READ PRIORITY : NCQ ON, higher priority for READ command
NO REORDER : Queuing ON, command executed as first in first out
NO PRIORITY : Queuing ON, command executed as possible re-order without special priority
*Native Command Queuing supports usually have dependency on host Operating System and SATA Drive. When any abnormal behavior encountered, please set this parameter to NO Queueing. To support NCQ, host has to set up operating mode of connecting SATA port as AHCI mode.

●AUX PORT MODE

AUX PORT MODE 0	0, 1, 2, 3

Definition of SGPIO and Breakout cable usage should not be changed.
0: Each miniSAS supports sideband SGPIO LED control and LCD control via 9 pin connector

● Disk Speed

Disk Speed 3Gb/s	3Gb/s

Speed of drive channels is fixed as 3Gbps.

●Fan speed control temperature

Set up temperature criteria for fan speed control

FAN SPEED TEMP 45 deg. C	20, 30, 40, 45*, 50, 55, 60 deg C

When the detected temperature (RAID Core chip) is higher than the FAN SPEED TEMP, the fan will be turned into high speed. The pre-set temperature is 45 degree and should not be changed.

●Flush cache command setup

Enable FLUSH CACHE	Enable / Ignore

Enable or Disable「FLUSH CACHE」command function. Default is “Enable”

● Background Write Setup

WRITE BACK MAX SIZE 2MB/CH	64KB / 128KB / 256KB / 512KB / 1MB / 2MB /4MB*

Setup the size of data stored in cache for Sequential Write

When data size written to cache is bigger than the setup size, data will be partitioned to parts

● Write Retry Mode Setup

WRITE RETRY MODE	NO WRITE RETRY MODE、 WRITE RETRY MODE*

Enable or disable RETRY when an error is detected during RAID-3/5 write operation. If NO WRITE RETRY MODE is set, an error will move the DVPro T10 status to「ONE DOWN」.

● Number of Power and Fan Setup

Single Power Fan 3	Single Power with fan 3*, Dual Power with fan 3 Single Power without fan 3, Dual Power without fan 3

Setup number of Power good detection and fan detection. This should not be altered unless reconfiguring the hardware on purpose. The default is Single Power with fan 3.

● Buffer Segment Size Setup

BUFFER SEGMENT SIZE 64KB/CH	8KB/CH, 16KB/CH, 32KB/CH, 64KB/CH, 128KB/CH, 256KB/CH*, 512KB/CH

Set up buffer segment size per drive channel. This is the size of data block for one command. For large sequential data access, the bigger size can give better performance. On the contrast, for random access, the smaller size can give better performance.

● **Wait Time of Retry Setup**

RETRY MAXIMUM TIME 5S	25S, 10S, 5S*, 1S, 0.1S

Setup the interval between drive time out and retry.（「1S」,「0.1S」is only for testing）
The actual processing time will take 2 or 3 times of the setting. OS might need to setup a longer time out interval because of the longer retry processing on storage system.

● **Sequential List Size Setup**

SEQUENTIAL LIST SIZE 8	8*, 16, 32, 64, 128

This is to setup the number of Sequential access stream. The system maintains a table of recording Sequential streams. It depends on simultaneous number of sequential streams and size of cache memory.

● **Sequential Read Ahead Multiplier Setup**

SEQUENTIAL READ AHEAD 8 TIMES	2 TIMES, 4 TIMES, 8 TIMES*, 16 TIMES, 32 TIMES

One time data read size depends on the bigger value between READ Ahead Size parameter and access size multiplies this Sequential Read Ahead TIMES. Cache memory will be quickly consumed if the large size is setup. Usually, the size should be set up small when host performance is low or vice versa.

● **Cache Control Setup**

DPO/FUA BIT ENABLE	ENABLE, DISABLE*

This is to Enable or Disable the cache control flag of SCSI standard.

DPO(Disable Page Out) ：Depend on the execution of command, DPO allows to discard the data in the cache by other commands.

FUA(Force Unit Access) ：During command execution, it forces the drive access.

For details, please refer to SCSI-2 standard.

● **Slow Drive Detection Time Setup**

CHECK DRV DELAY TIME 1S	NONE, 0.1S, 0.5S, 1S*, 5S

This setting decides how long to wait for the drive response.「0.1S」,「0.5S」are for testing
This function does not work when the system is under「NONE」or「ONE DOWN」or「SYSTEM DOWN」.
If there is a certain process, and it causes data retries within a certain disk or media, or the time needed to write to another drive taking long, then entire performance is slow down.（Transfer speed will suffer.）
In this sense, it is an early indication to warn for replacing slow drives.
The slow disk channel warning will be displayed on the LCD.

● Power On Standby Time Setup

WAIT POWER ON TIME 10S	1S, 5S*, 10S, 15S, 20S

Sometimes drives are not immediately accessible to host after power on. For this period specified, the RAID controller will return to host access with such not ready status. (For example, “Not Ready” is responded to “Test Unit Ready” command.)

● Drive Ready Wait Time Setup

HDD WAIT READY TIME 1 MIN	1 MIN*, 3 MIN, 5 MIN

Set up time to wait for Drive getting Ready.
Usually the drive is judged as DOWN if it is not ready after certain period after power on but some high speed and high capacity drive will need a longer period WAIT time to get ready.

● Cache Memory Check Timing Setup

CHECK CACHE NORMAL	NORMAL*, FAST, NO

This setting specifies the speed of the background cache memory check to take place at the system power on initialization. If it is set to “NO”, no cache check will be executed at power on. If you wanted to run performance benchmark right after power on, you can set this to NO for the purpose.

● HDD Patrol Mode Setup

AUTO HDD PATROL	NO, AUTO*

Normally the surface scan of HDD will be executed in background. (Not applicable for RAID-0)

NO : No Auto Patrol
AUTO : Auto Patrol On
The surface scan will start from LBA 0 of the disk between host commands.

If there is any failure on read sector, the recovery sector generated by other disks will be written to the disk for recovery. (Rewrite Function)
PATROL Mode can be changed during operation.

● **Patrol Time Setup**

SYSTEM PATROL 30 DAYS/CYCLE

10S, 5S, 3S, 5 DAYS/CYCLE,
10 DAYS/CYCLE, 20 DAYS/CYCLE,
30 DAYS/CYCLE*

This parameter is to specify the period of doing patrol. You can setup 「10S」,「5S」,「3S」to perform one time patrol or you can setup「5 DAYS/CYCLE」,「10 DAYS/CYCLE」,「20 DAYS/CYCLE」,「30 DAYS/CYCLE」to perform whole capacity patrol.
The length of one Patrol depends on this setting and the Buffer Segment Size.

Continuing to push MODE button will roll into RAID operational parameters.

2.5.2 Parameter Confirmation

Sometimes you will need to read and confirm the setup of current parameters then you can press both MODE and SELECT button on the front at the same time for this. Firmware version will be shown at the beginning and the parameter can be rolled among by pushing MODE button.

< Factory Default Setting > This is a convenient form for customer to record all parameters.

Parameter	Default or Pre-set	Notes
Firmware	Firm ware is Ver. x.xxx	Change if firmware is upgraded
Vendor ID	Vender ID is BIOS	
Model No	Product ID is DVT10T2	Vary as different models
Serial No	Serial No ID xxxxxxxx	
IP Address	**192.168.50.210**	Can be changed by SELECT Button
Address Mask	**255.255.255.0**	Can be changed by SELECT Button
RAID Mode	RAID MODE **RAID-6**	SINGLE DRIVE / RAID-1 / RAID-0 2 / RAID-1 3 / RAID-10 / RAID-6 / RAID-0 / RAID-3 / RAID-5
Drive Mode	DRIVE MODE **10**	3 / 4 / 5 / 6 (7, 8, 9, 10 for 10 drive model)
Sector Size	NA	512B / 4K
Flush Cache	**Enable** FLUSH CACHE	Enable / Ignore
Host Mode	**Thunderbolt2**	Thunderbolt2 / eSATA Enable / eSATA Disabled
AUX Port Mode	**0**	0/1/2/3
USB3 Host	**Disabled**	Enabled / Disabled
Disk Speed	Disk Speed 3**Gb/s**	3Gb/s
Disk Size	DISK size	Test1GB/120GB/160GB/250GB/400GB/500GB/750GB/1TB /2TB/3TB/4TB/5TB/6TB/7TB/8TB
LUN MODE	LUN **DIRECT no BIAS**	DIRECT NO BIAS / SWAPPED NO BIAS / DIRECT for MBR / SWAPPED for MBR
Cache Size	CACHE SIZE 1GB	64 MB / 1GB
LUN Size	LUN SIZE **FULL**	FULL / MAX 2TB / 1/2 DIV / 64GB+ALL / 64GB+MAX2TB / 256GB+ALL/ 1TB+ALL/ 2TB+ALL
Parity Stripe	PARITY STRIPE **2 MB**/DRIVE	2 MB / 1 MB / 256 KB / 128 KB
Read Ahead	READ AHEAD **64 KB**	0 KB / 8 KB / 64 KB / 256 KB / 1 MB / 4 MB
Recover RATE	**5Min./GB**	TIME 0Sec / TIME 0.1Sec / TIME 1Sec / TIME 10Sec/ 2Min./GB / 5Min./GB / 10Min./GB / 20Min./GB
Write Mode	WRITE **ALL PENDING 0.1Sec**	WAITING / BUFFERD / PENDING 0.1Sec / 1 Sec / ALL PENDING 0.1Sec / 1Sec
Retry Time	RETRY MAXIMUM TIME **5S**	25S / 10S / 5S / 1S / 0.1S
DPO/FUA	DPO/FUA BIT **Disable**	ENABLE / DISABLE
Check Delay	CHECK DRV DELAY TIME **1S**	NONE / 0.1S / 0.5S / 1S / 5S
Power On Wait	WAIT POWER ON TIME **5S**	1S / 5S / 10S / 15S / 20S
Wait Ready	HDD WAIT READY TIME **1 MIN**	1 MIN / 3 MIN / 5 MIN
Sequential Ahead	SEQUENTIAL READ AHEAD **8**	8 TIMES / 16 TIMES / 32 TIMES / 2 TIMES / 4 TIMES
Check Cache	CHECK CACHE **NORMAL**	NORMAL / FAST / NO
Auto Patrol	**AUTO** HDD PATROL	AUTO / NO
Patrol Wait Time	SYSTEM PATROL **30 DAYS/CYCLE**	WAIT 10S / 5S / 3S /5 / 10 / 20 / 30 DAYS/CYCLE
Write Retry	**WRITE RETRY MODE**	NO WRITE RETRY / WRITE RETRY
Back Write Size	WRITE BACK MAX SIZE **2MB/CH**	64KB / 128KB / 256KB / 512KB / 1MB / 2MB / 4MB
Parity	**ENABLE** PARITY	ENABLE / DISABALE
Buffer Segment	BUFFER SEGMENT SIZE **256KB/CH**	8KB/CH / 16KB/CH / 32KB/CH / 64KB/CH / 128KB/CH / 256KB/CH / 512KB/CH
Sequential List	SEQUENTIAL LIST SIZE **8**	8 / 16 / 32 / 64 / 128
Verify Wait	**VERIFY WAIT NO READ aft WRITE**	VERIFY WAIT READ aft WRITE / VERIFY WAIT NO READ aft WRT / NO VERIFY READ aft WRITE / NO VERIFY NO READ aft WRT

Quick Overview of From Panel Button Operation

DVPro series button operations can be summarized as below

Item		Operation
Force Reset		MODE + POWER ON
Mute Buzzer		MODE
Parameter Setup	Start	MODE + SELECT + Power ON
	Roll next item	After parameter setup MODE
	Change the setting	After parameter setup SELECT
	Write the setting	After parameter setup MODE + SELECT
	Cancel the change	Power Off during the parameter change
Status Information	Browse parameters	During operation MODE + SELECT Press MODE to roll to next parameters
	Check Error Status	During operation SELECT MODE + SELECT cancel
	Cancel RETRY display	During operation, press MODE + SELECT buttons
	Performance information	After browsing parameters, press SELECT Use MODE to check each drive
	Cache Memory Confirmation	Press MODE after performance confirmation
	Slow Drive Confirmation	Press MODE after cache confirmation
	PATROL Mode Change （Auto、Force、No）	Press MODE after slow drive confirmation SELECT : switch among settings MODE + SELECT to set the change

MAC Address →
IP Address →
Address Mask →
Gate Way Address

MODE
MODE

	Address Confirmation	Press after PATROL Mode Change to check each address

2.6 Web-based Monitor and Setup via Ethernet

To monitor DVPro via Web management GUI, you can connect Ethernet cable to a host computer.

Ethernet parameter must be configured correctly before launching a Web browser (such as Internet Explorer). To setup IP Address, please follow steps below.

● **Setup Mode**

First press and hold both MODE and SELECT buttons at power on. The system will enter Parameters Setup mode as shown on LCD display.

ARRAY PARAMETERS SETTING

● **Default IP address**

The default IP address of the product is 192.168.50.210

IP Address 192.168. 50.210

● **IP Address Setup**

Press SELECT then MODE button to setup IP address.
Use SELECT button to change the number of each digit.
Press MODE for rolling to next field.
Hold SELECT button then number will have number increase faster.

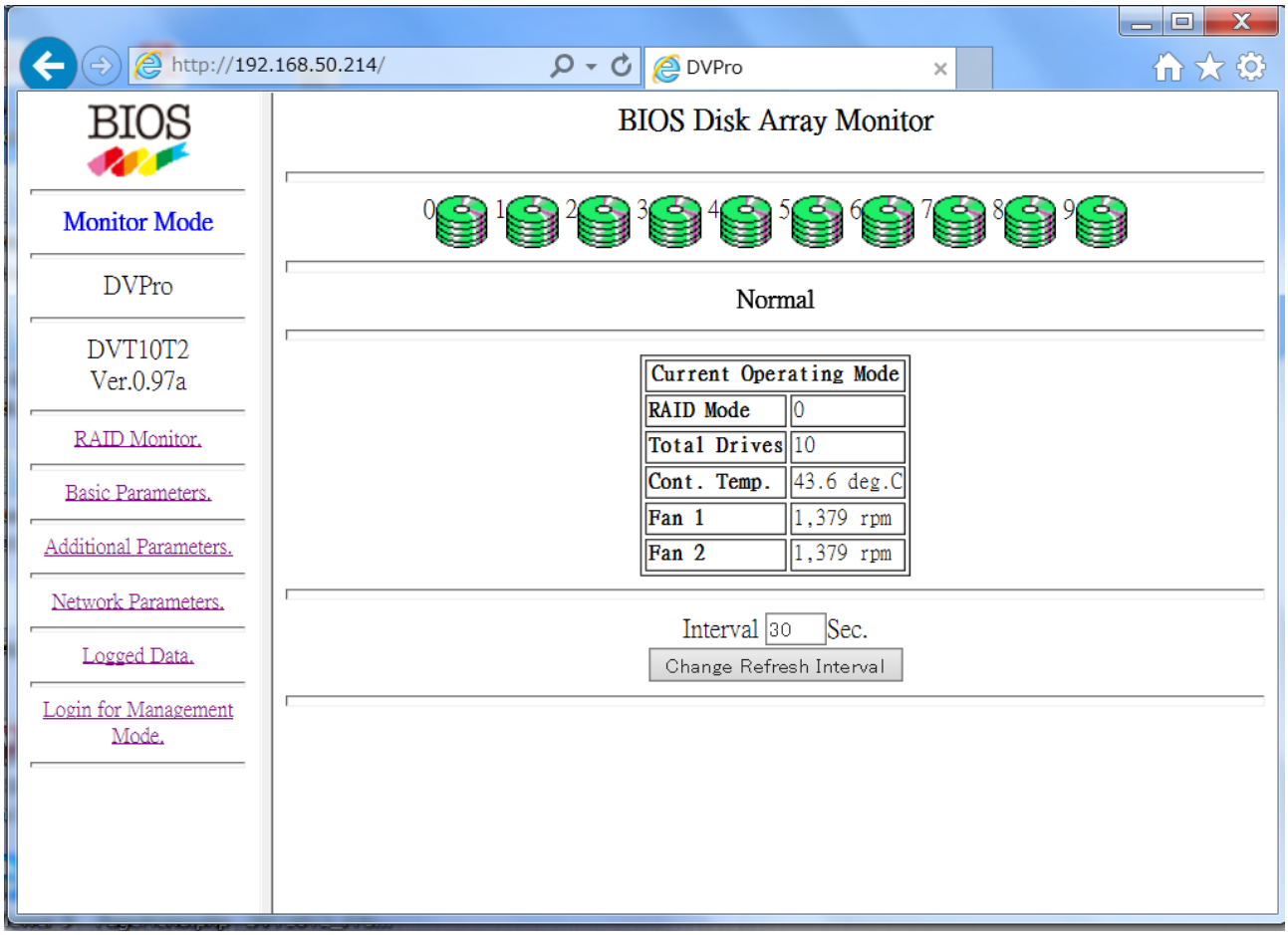
After setting up, press MODE and SELECT at the same to save the change

POWER DOWN PLEASE!

New IP address will not be effective till the unit reboot.

2.6.1 Main Screen of Web GUI

With power on and Ethernet connected, launch the Internet browser with preset IP address.「http://<IP Address>」. The Web GUI will be displayed as below for Monitor Mode.



The left hand side lists main menu items and the right side displays detail items or information associated with the selected menu item.

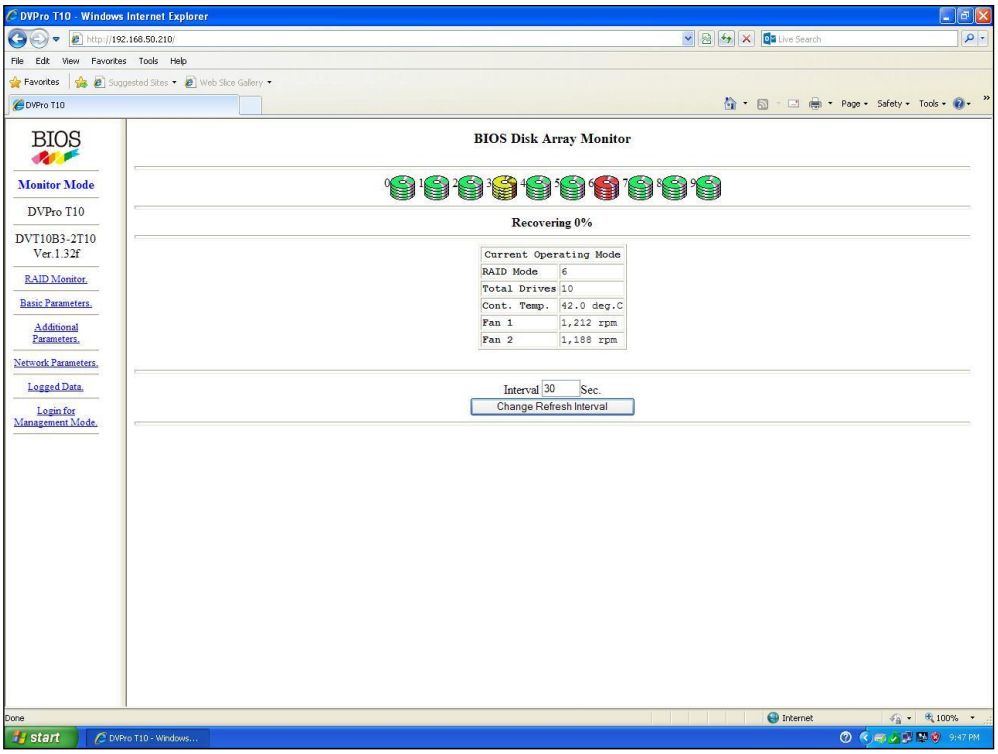
2.6.2 Introduction of Monitor Mode

DVPro Status Monitor:

Click [RAID Monitor] on main menu to check the enclosure status. The refreshing interval can be changed by specifying the requested time and apply Change Refresh Interval.

Drive status is differentiated by color.

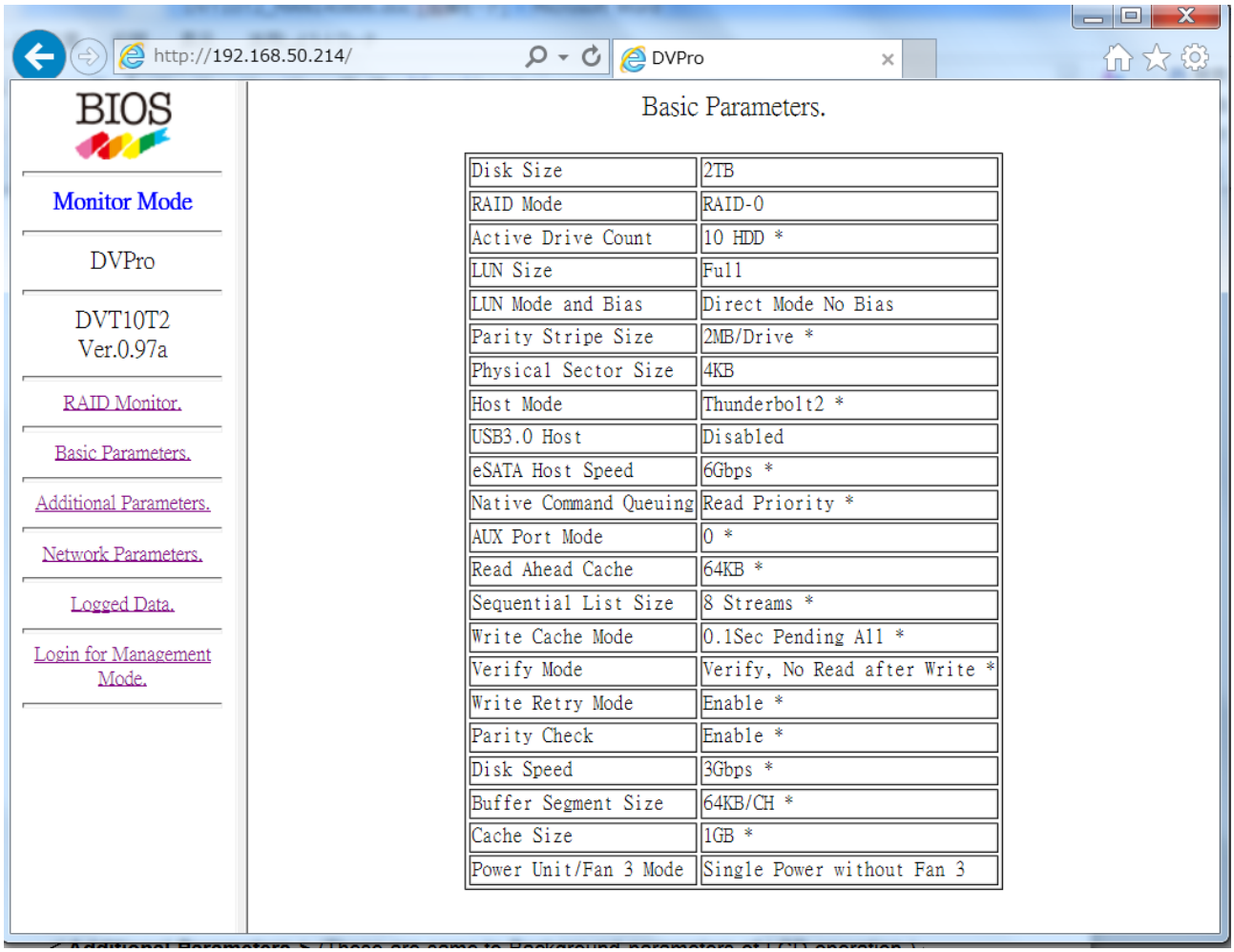
Green	Red	Yellow	White
Normal	One Down Two Down System Down	Recovering Verifying	No Disk installed



Monitor mode can be used to check status only instead of changing RAID parameters.

<Basic Parameters>

Click on main menu [Basic Parameters] to show basic RAID parameters.

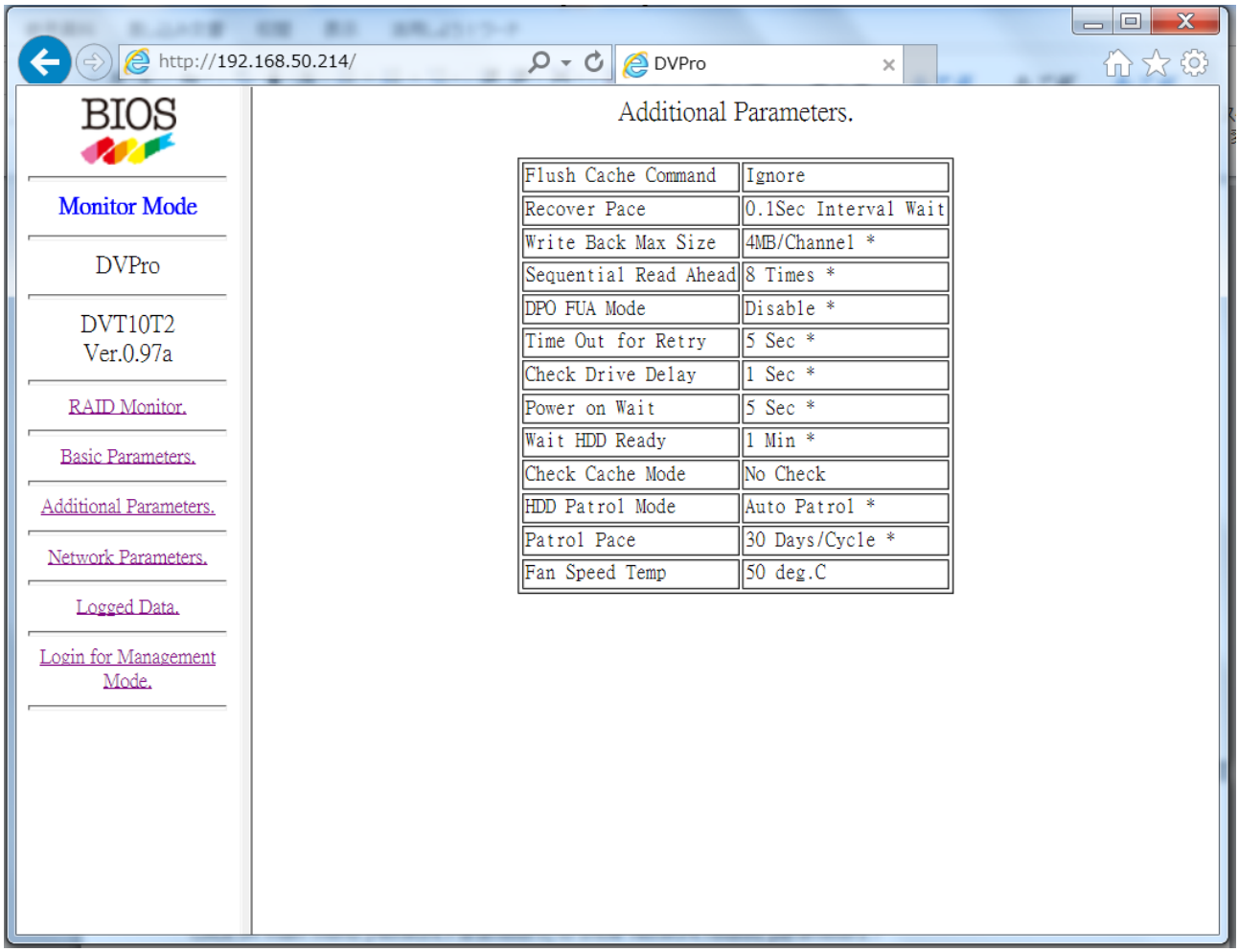


＜Basic parameter screen＞

＜Additional Parameters > (These can be found in Background parameters of LCD operation)

Click on main menu [Additional Parameters] to show additional RAID parameters.

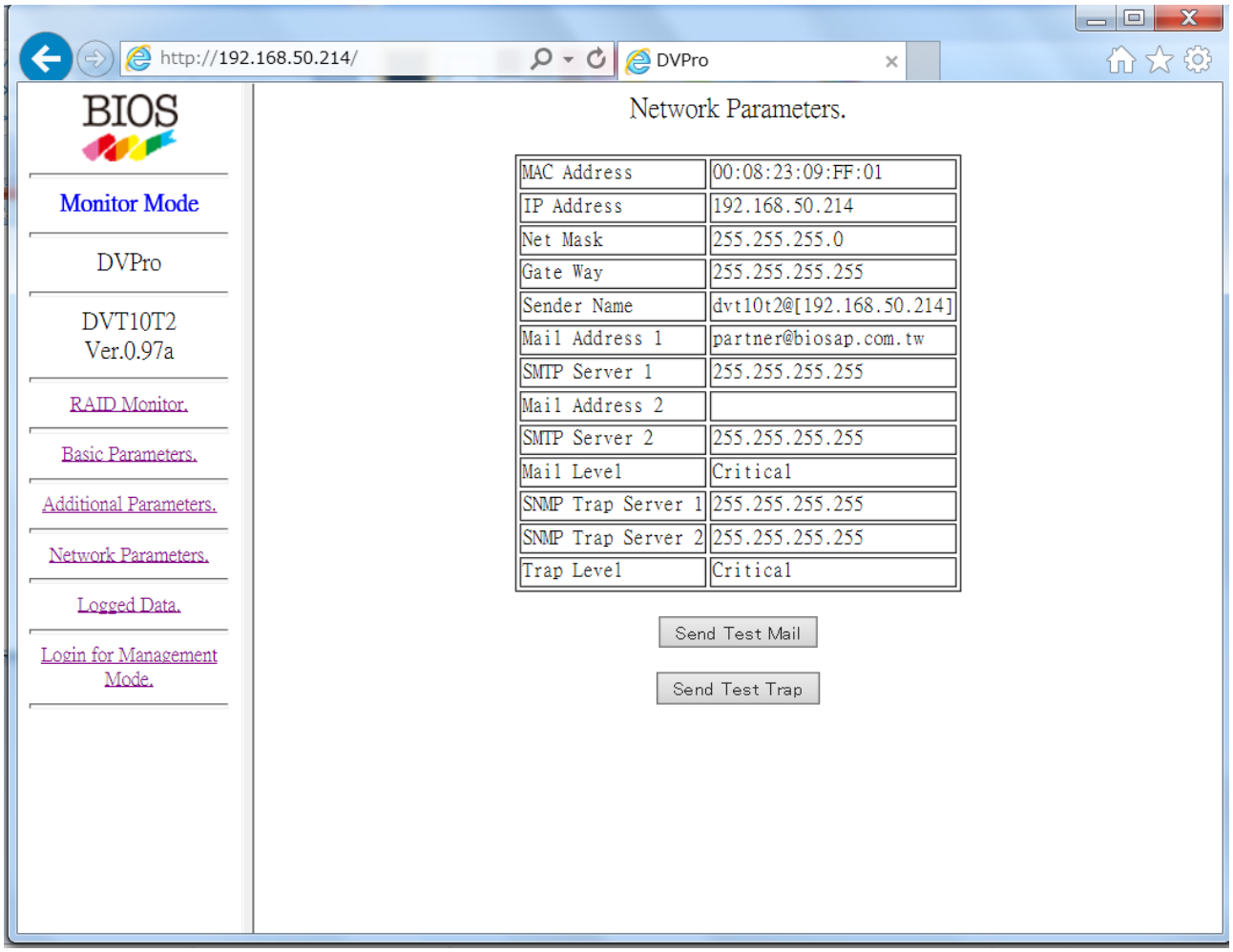
Additional parameters can be changed after logging in Management Mode. For details, please refer to 2.7


http://192.168.50.214/
DVPro
BIOS
Monitor Mode
DVPro
DVT10T2
Ver.0.97a
RAID Monitor.
Basic Parameters.
Additional Parameters.
Network Parameters.
Logged Data.
Login for Management Mode.
Additional Parameters.
Flush Cache Command | Ignore
Recover Pace | 0.1Sec Interval Wait
Write Back Max Size | 4MB/Channel *
Sequential Read Ahead | 8 Times *
DPO FUA Mode | Disable *
Time Out for Retry | 5 Sec *
Check Drive Delay | 1 Sec *
Power on Wait | 5 Sec *
Wait HDD Ready | 1 Min *
Check Cache Mode | No Check
HDD Patrol Mode | Auto Patrol *
Patrol Pace | 30 Days/Cycle *
Fan Speed Temp | 50 deg.C

＜Additional RAID parameters＞

＜Network Parameters＞

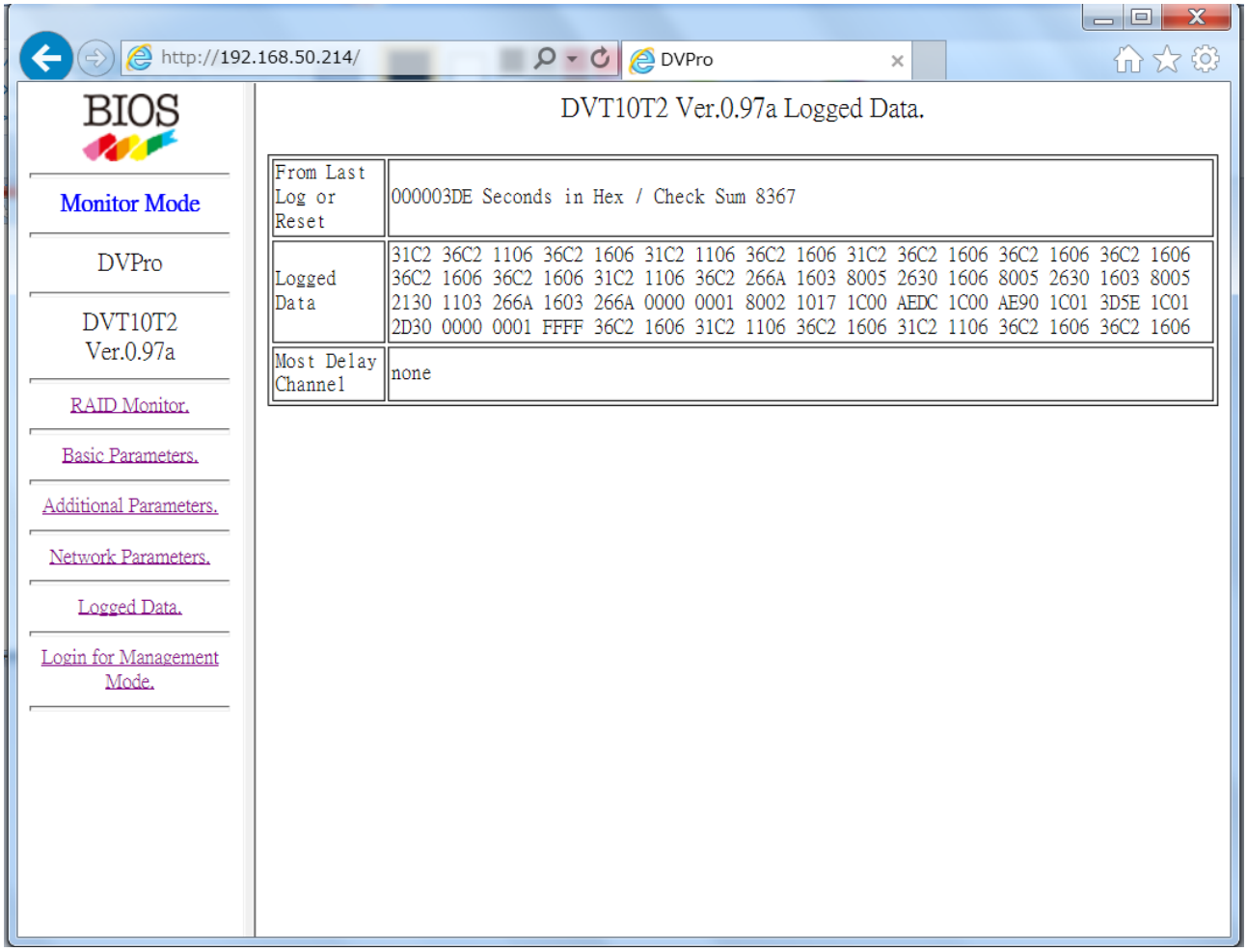
Click on main menu [Network Parameters] to show Network related parameters.



＜Network related parameters screen＞

＜Logged Data＞

Click on main menu [Logged Data] to show Log data of the storage


http://192.168.50.214/
DVPro
BIOS
Monitor Mode
DVPro
DVT10T2
Ver.0.97a
RAID Monitor.
Basic Parameters.
Additional Parameters.
Network Parameters.
Logged Data.
Login for Management Mode.
DVT10T2 Ver.0.97a Logged Data.
From Last Log or Reset
000003DE Seconds in Hex / Check Sum 8367
Logged Data
31C2 36C2 1106 36C2 1606 31C2 1106 36C2 1606 31C2 36C2 1606 36C2 1606 36C2 1606
36C2 1606 36C2 1606 31C2 1106 36C2 266A 1603 8005 2630 1606 8005 2630 1603 8005
2130 1103 266A 1603 266A 0000 0001 8002 1017 1C00 AEDC 1C00 AE90 1C01 3D5E 1C01
2D30 0000 0001 FFFF 36C2 1606 31C2 1106 36C2 1606 31C2 1106 36C2 1606 36C2 1606
Most Delay Channel
none

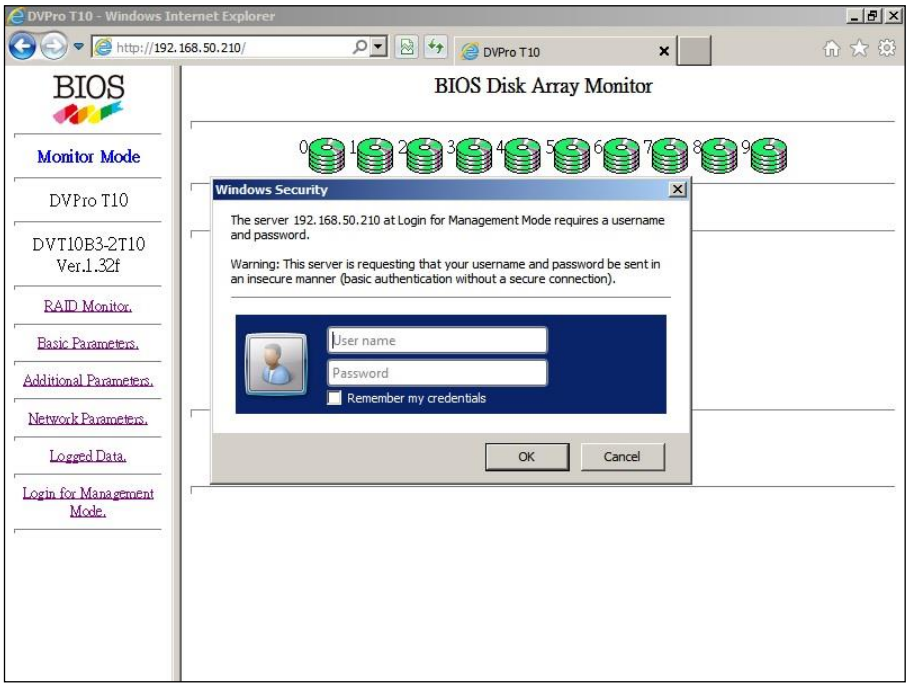
＜Logged data screen＞

Log data shows the historic events after power on. First item on top of the log table shows either the lapse of last log or the lapse time after power on. Time is shown in Second by hexadecimal. The checksum value on its right side is only for firmware identification. It varies from each firmware version.
The number 0020～0022 has special meaning for email notification error. See “Setup of email notification” section below for explanation.
The log is not intended to be examined by end users and should be reported to technical support staff whenever it is required.

2.6.3 Management Mode Login

To configure Additional parameters, email notification and SNMP traps, you need to login to secured Management state.

Click [Login for Management Mode] on main menu.

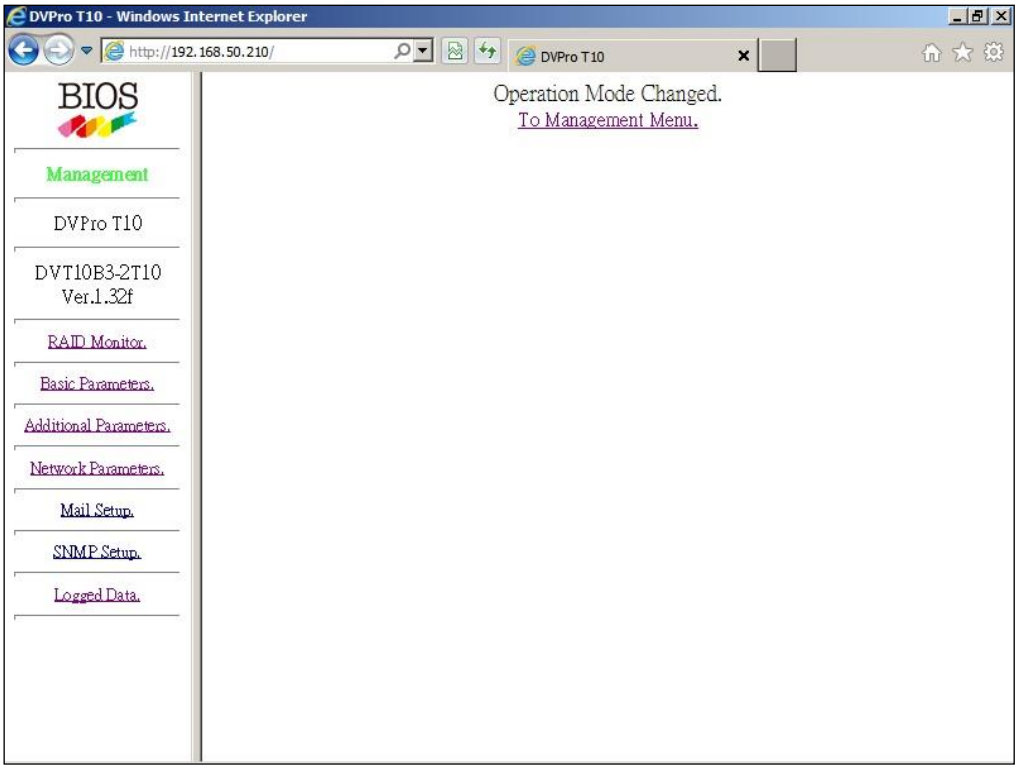


＜Pop window for User Name/Password to enter Management mode＞

Default password is**"passwd"** and leave user name empty

- To change password, refer to **2.7 Setup** ＜Change Password＞

Switch to Management Mode by clicking on [To Management Menu] when "Operation Mode Changed" is pop up on right display panel as below screen shown.



＜Page indicates Management mode＞

User can configure EMAIL notification and SNMP setting also modifying Additional Parameters under

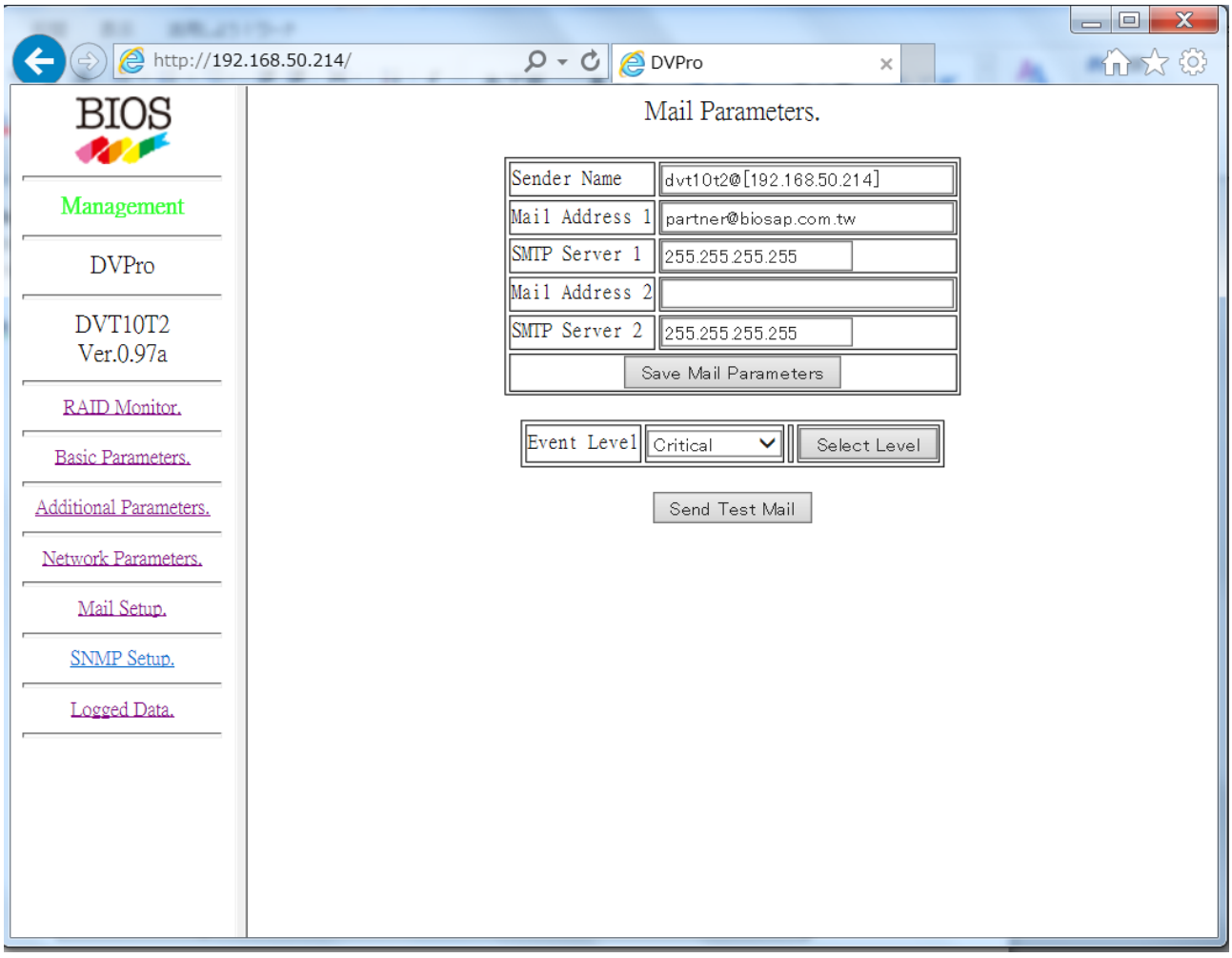
Management mode.

2.6.4 Setup of email notification

＜Mail Setup＞ Mail Setup

It allows you to change email notification parameters and send a test email.
It is necessary to login to Management Mode or Parameter Setting Mode before you can make the change.

Click on [Mail Setup] from the main menu.



＜Page for setup mail parameters＞

- **Sender Address dvt10t2@192.168.50.214**
  Up to 63byte alphabet, number, “_”, “-“, “@”, and “.” is allowed. Two byte characters such as Chinese are not allowed.

- **Receiver Address partner@biosap.com.tw**
  Up to two receiver addresses are allowed.
  For users who want to have more than 2 receivers, you need to setup aliases on assigned email server. Allowable characters are same as Sender address.

- **SMTP Server Address255.255.255.255**
  Setup IP Address of SMTP server.

IP of 255.255.255.255 will prohibit emails to be sent out.

1） Directly setup the IP to SMTP server

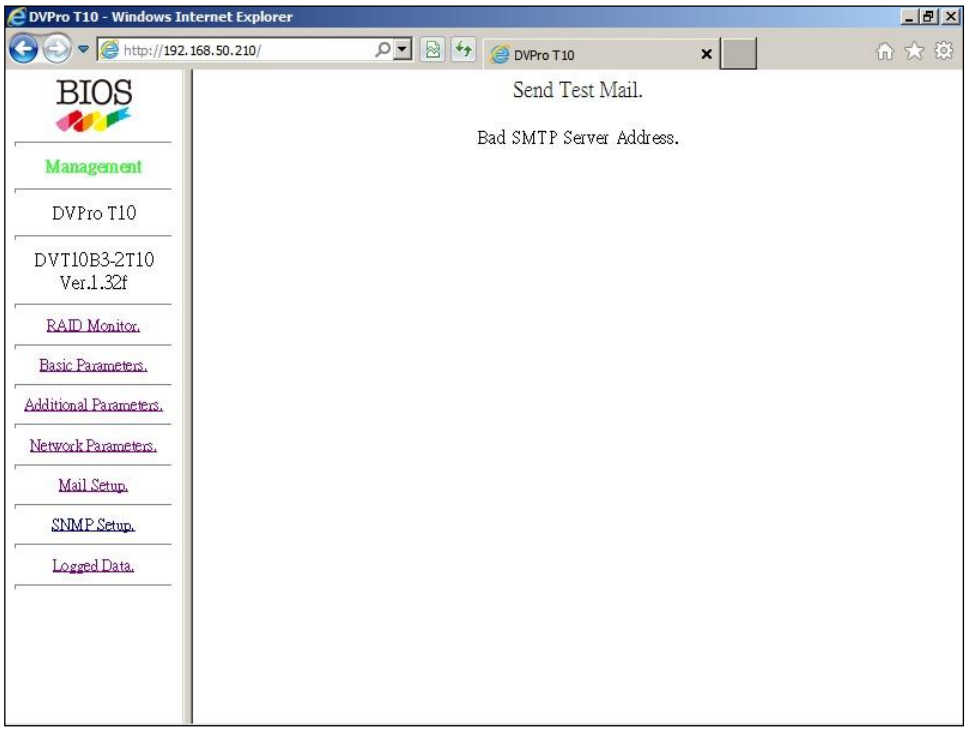
This is most effective way to issue email alert. However Gateway address might be necessary if SMPT server is not within the same LAN domain. (See Basic Parameter, Setup page) At the same time, this will expose the DVPro T10 to external network environment resulted in security issue.

2） Assign local SMTP Server

If there is no need for authentication, you can forward (relay) from DVPro T10 notification by setting up the local SMPT server. For Windows OS, you can setup IP address of DVPro T10 on SMPT which has the RELAY function.

● **Send Test Mail （button）**

By clicking on “Send Test Mail” button following the email setup, you can send a test email to the receiver address for confirmation.



＜A failed screen＞

There will be “Sending Test Mail” shown on the screen indicating the email in transmission. And the log will record a message if the test mail was sent out. If the Send Test Main failed after retried, an error log will be recorded.

0020: SMTP was not found
0021: Gateway was not found
0022: SMTP did not respond

It might take up to 10 minutes for the retrial if the mail could not be sent.

There might be cases which SMTP did respond but with wrong answer. We suggest trying a different SMTP server under such situation.

2.6.5 Mail Format

The mail format is looked like below:

From: DVPro@[192.168.50.210]

To: partner@biosap.com.tw
Subject: Alert from DVPro T10

Alert Condition of BIOS DVProxx-xxx6 Ver.x.xxx
Serial Number= xxxxxxxx
Alert Reason = Test of Send Mail.

１） From: Mail sender, this machine
２）To: Receiver
３）Subject:
４）Alert Condition of vendor name, device name, and version.
５）Serial Number: the serial number of this device
６）Alert Reason: Cause of this email sent

2.6.6 Conditions of Mail Notification

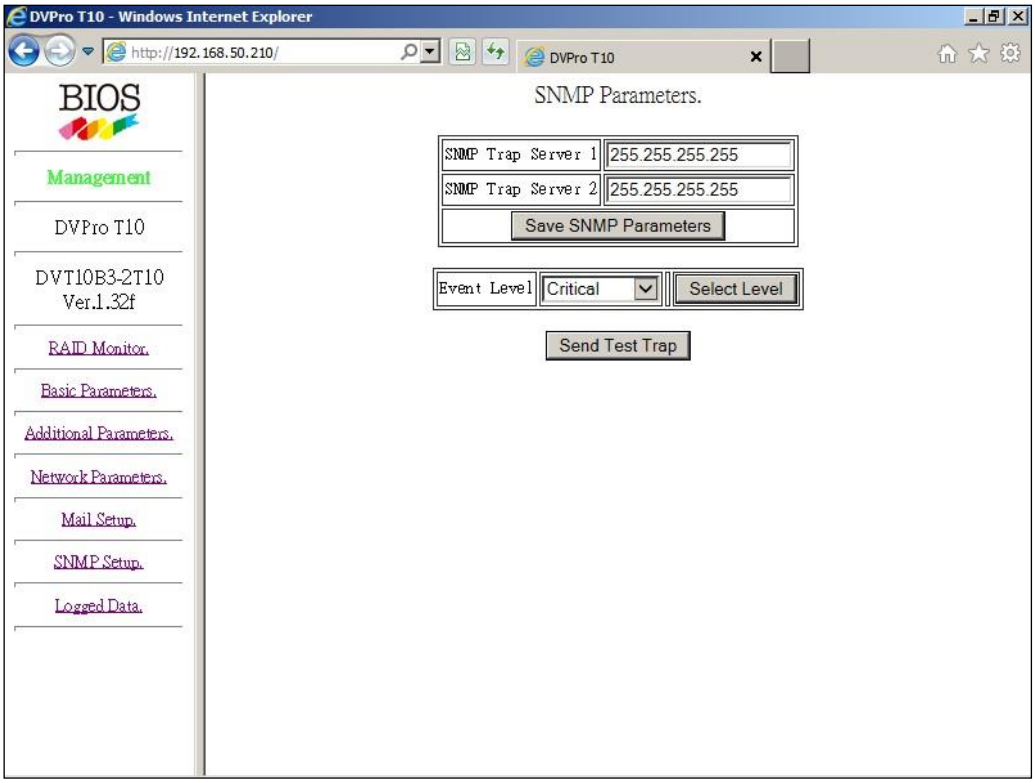
Under below conditions, the mail will be sent:

１）Drive failure	One Drive Down
	Two Drives Down
	System Down
２）Completion of Drive Recovery	Recover Finished
３）System Power Off	Power Unit Down
４）Fan is failed	Fan Unit Down

If the event was remained, the same email will be sent again upon the power recycling. If there are more than two events happened at the same time, only the first one will be sent.

2.6.7 SNMP Setup

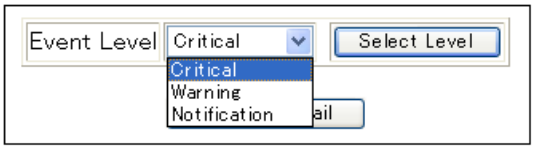
Click SNMP Setup on Main Menu, and follow below steps to configure SNMP.



SNMP Setup screen

1. You can setup IP address of your SNMP server on 「SNMP Trap Server 1/2」. If server is not located within LAN, please input same IP address of your Gateway. Click

to save these IP addressed.
2. Setup the level of status monitor. There are a total of three categories explained below:



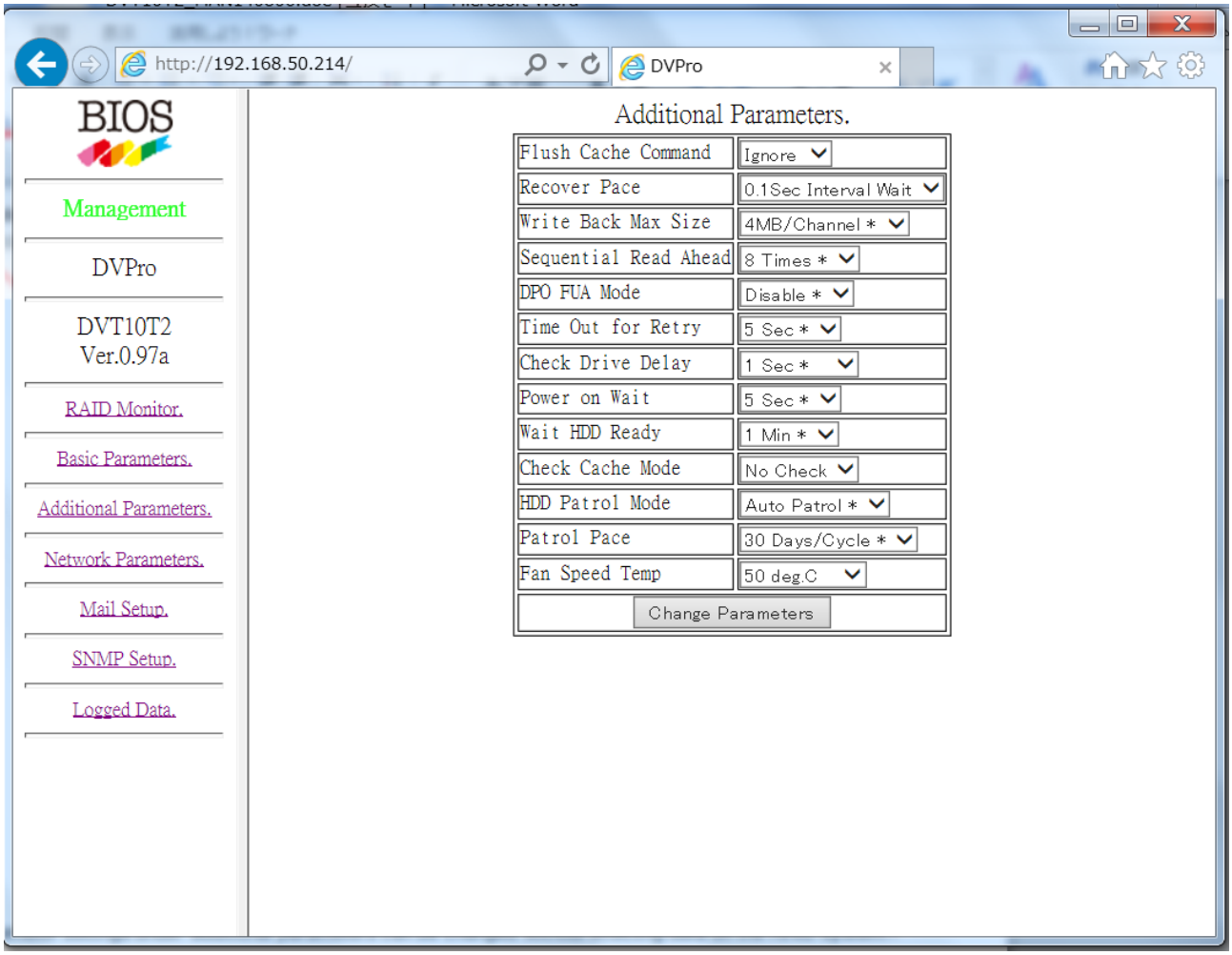
3. Click

after you choose level to test if it is succeeded or not.

2.6.8 Additional Parameters Setup

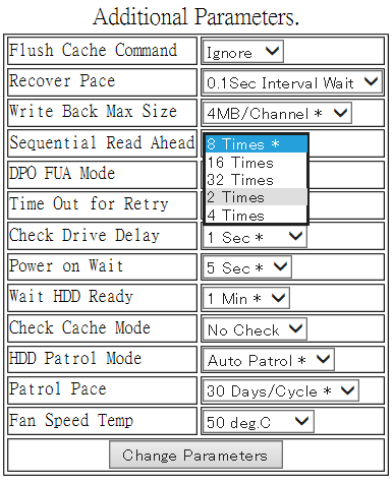
< Additional Parameters >

In Management Mode, click Additional Parameters on main menu to setup Additional Parameters Page



＜Additional Parameters Page＞

Parameter settings under additional parameters can be changed without effecting data on the RAID system.



Scroll to the parameter value you wish to change then click [Change Parameters] button to save the change.

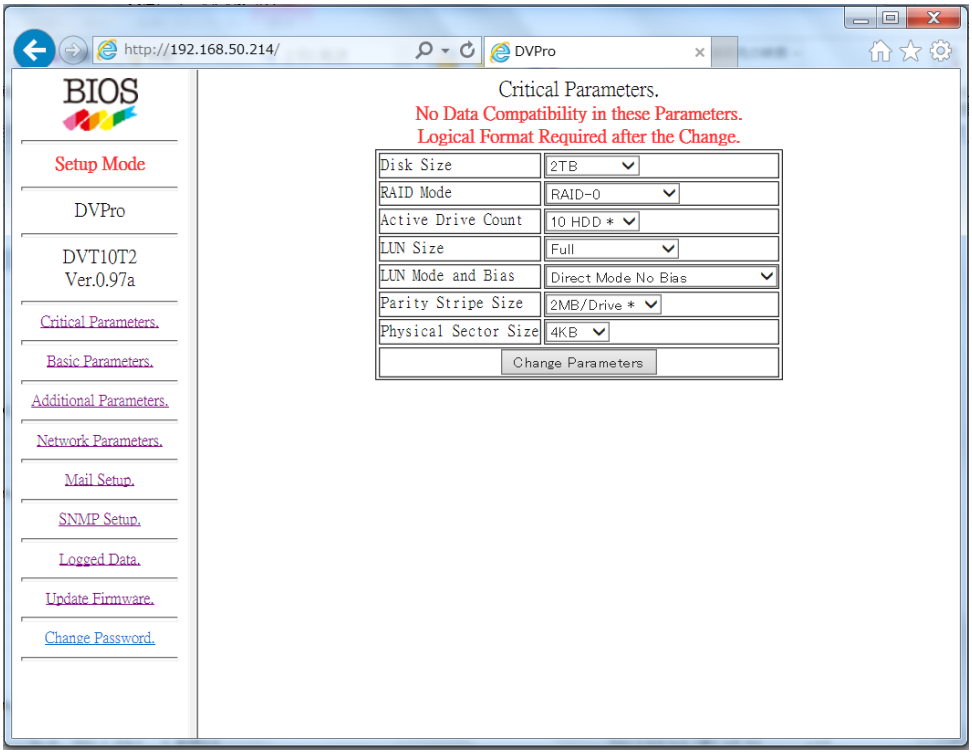
2.7 Setup Mode (Array Parameters Setting)

A power recycle of the RAID storage is necessary to get into Setup mode. Under Setup mode, you can change all kinds of parameters for the controller.

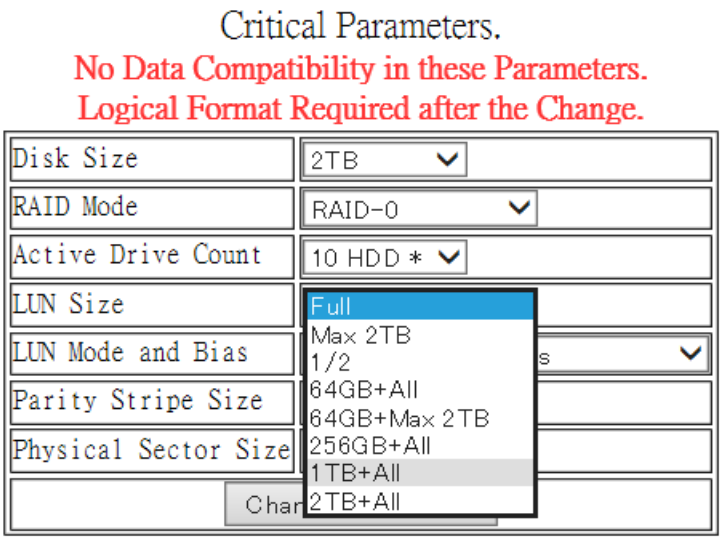
Power on the RAID storage while holding both MODE and SELECT buttons (about 3 seconds) to enter Setup Mode. (LCD Display: ARRAY PARAMETERS SETTING)

Launch the web browser with preset IP Address to connect to the management GUI.

＜Critical Parameters＞
Click on Critical Parameters on main menu to enter Critical Parameters page.



＜Critical Parameters Page＞



＜Parameter Example: LUN Size＞

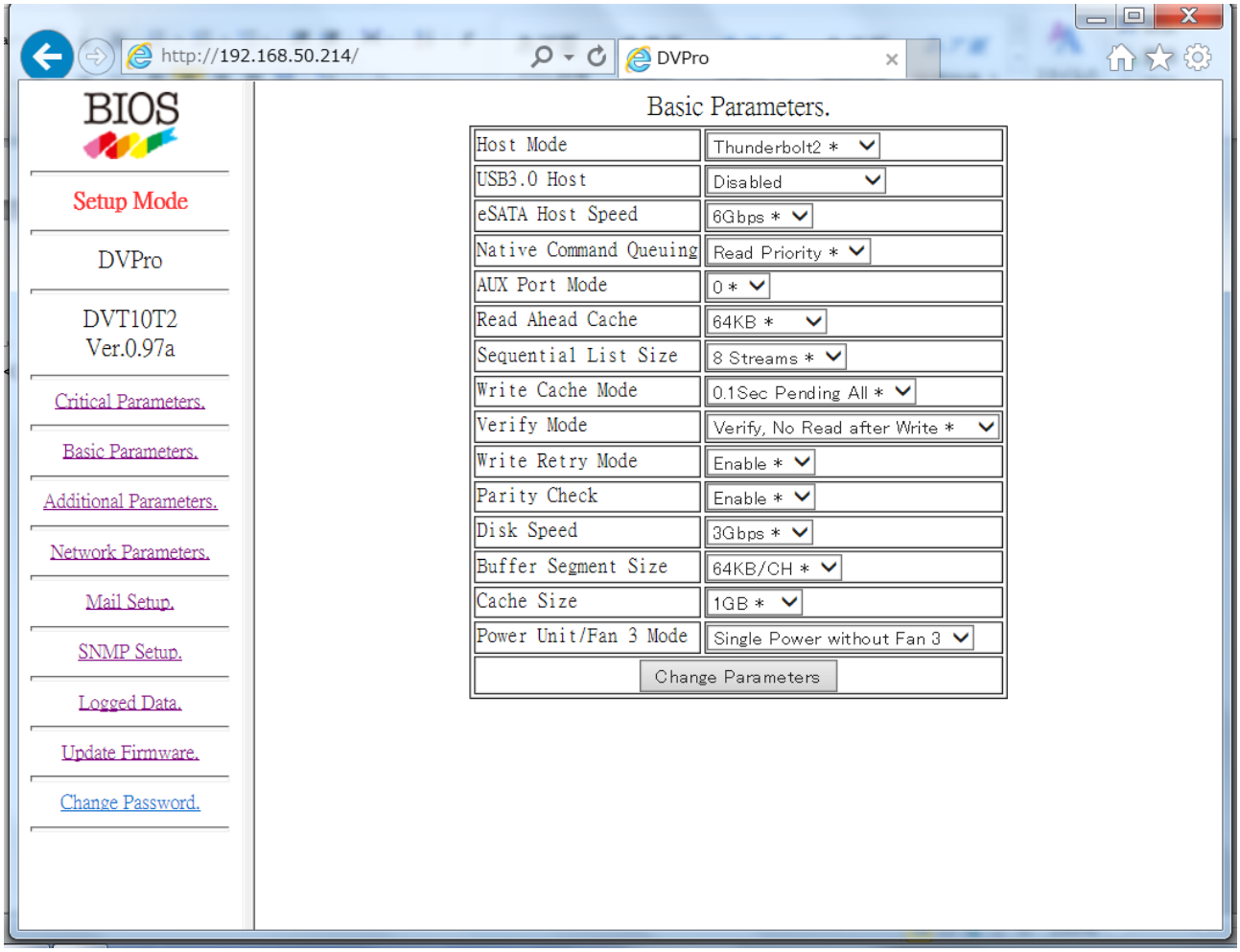
Scroll to the parameter needed to be changed and click Change Parameters button to save it. Reboot the RAID system to make new parameters effective. Press MODE button at first time power on to initialize the RAID after the change.)

Warnings

Change of any critical parameters will result in whole data loss. After change, it is required to re-create new partition and format the data volume

＜Basic Parameters＞

Click [Basic Parameters] on main menu to enter Basic Parameters page.

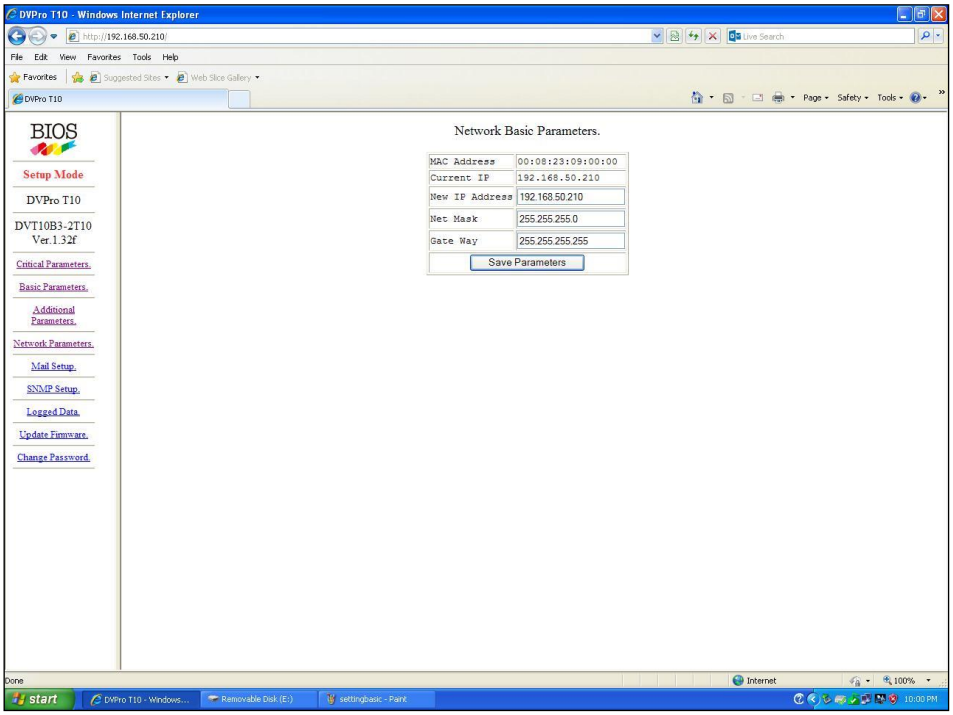


＜Basic Parameters Page＞

Choose the parameter from drag down menu for the change. Press [Change Parameters] button to save it. Then, reboot the RAID system to reflect the change.

<Network Parameters>

Click on Network Parameters on main menu to change Network Parameters page.

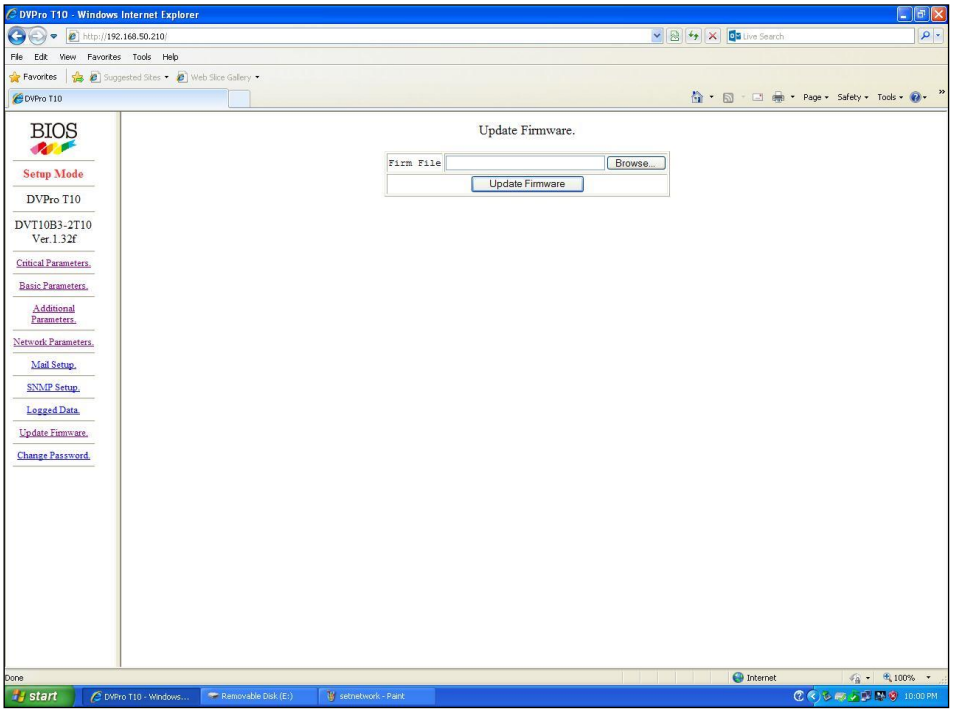


＜Network Parameters Page＞

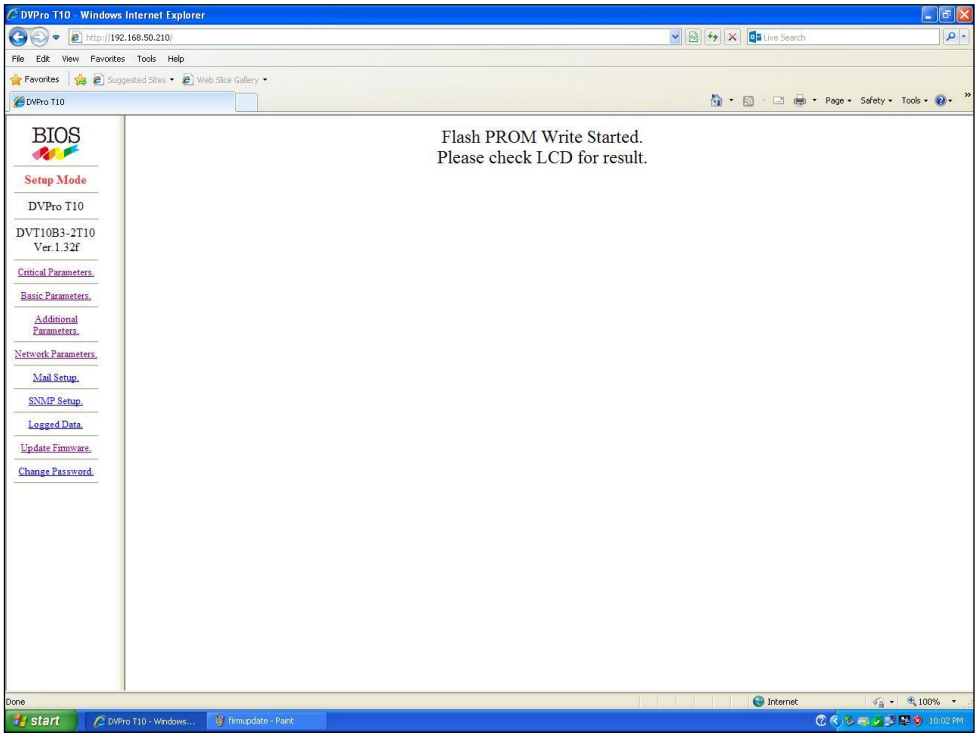
After entering correct network information, click [Save Parameters] button to save it. Then, reboot the RAID system to reflect the change.

<Update Firmware>

Click on Update Firmware on main menu to update firmware.



Browse firmware file and click [Update Firmware] button to start update process.



Once firmware update is successfully started, the screen will show " Flash PROM Write Started …" , and front LCD display will show following message. Depend on browser, the progress bar will be shown such as Chrome.

＜DVPro T10　LCD Display＞

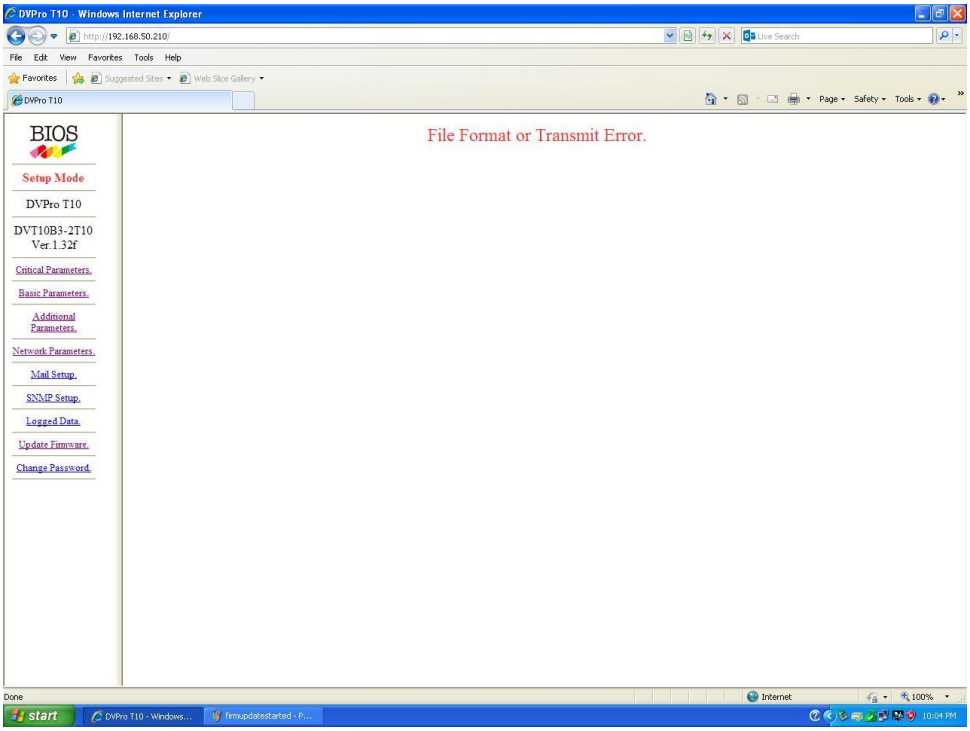
Please Wait ! Firm Updating

Firmware is being updated

Power off Now ! Firm Update OK

Upon completion, LCD message will show “Power off Now….”. Please reboot the system to make new firmware effective.

If the update process failed for any reason, the following screen will be shown.



＜Wrong firmware file or transmission error＞

＜DVPro T10　LCD Display＞

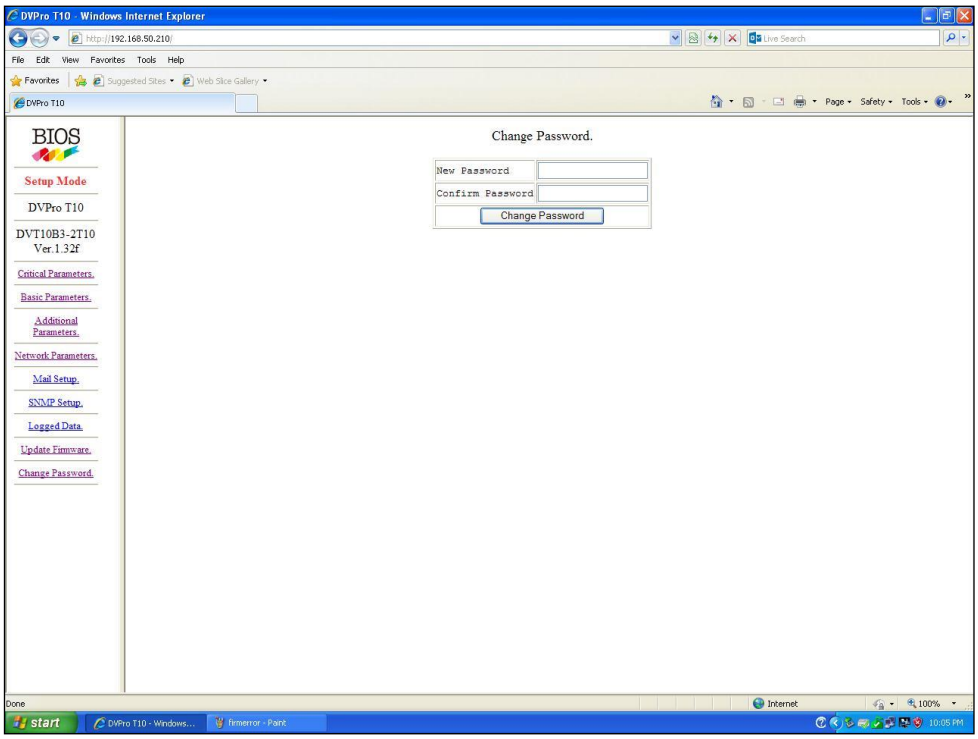
Error Retry Now ! Don’t Power off

Error has occurred during the process.

Warning!!
Do not turn off RAID system at this point. Instead, retry again without rebooting the system. If the process still failed, please contact our support staff.

<Change Password>

In Setup Mode, click Change Password on main menu to enter Change Password page. This allows you to change the password of “Management Mode”.



＜Change Password Page＞

1）Enter new password in New Password and Confirm Password box. (Max 6 digits)

2）Click Change Password button to save the change

Reboot the RAID system for change to take effect.

What if I forgot my password？

User can setup a new password without inputting an old password.

●Available functions for each Mode with WEB GUI

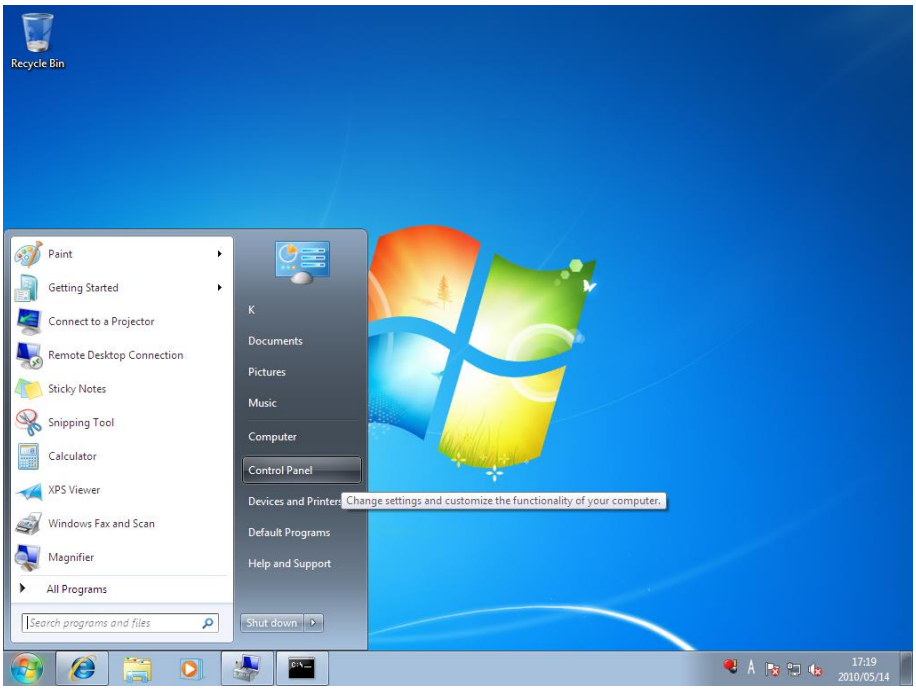
Menu	Monitor Mode		Management Mode		Setup Mode	
	Read	Modify	Read	Modify	Read	Modify
RAID Monitor	O	X	O	X	X	X
Basic Parameters	O	X	O	X	O	O
Additional Parameters	O	X	O	O	O	O
Critical Parameters	X	X	X	X	O	O
Network Parameters	O	X	O	X	O	O
Mail Setup	X	X	O	O	O	O
SNMP Setup	X	X	O	O	O	O
Logged Data	O	X	O	X	O	X
Update Firmware	X	X	X	X	O	O
Login for Management Mode	O	O	X	X	X	X
Change Password	X	X	X	X	O	O

Read：You can see the items

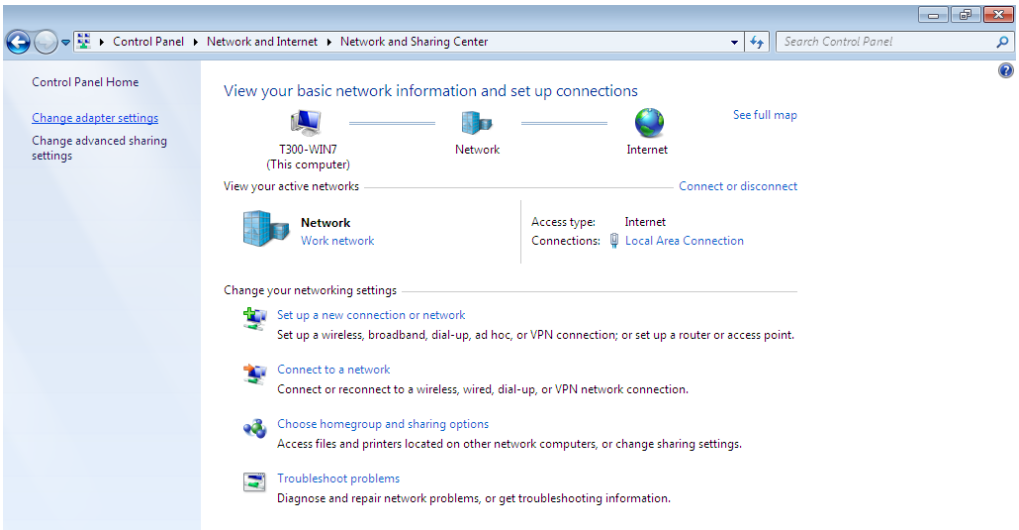
Modify：You can modify the parameters or executes the operation.

2.8 Host LAN Configuration

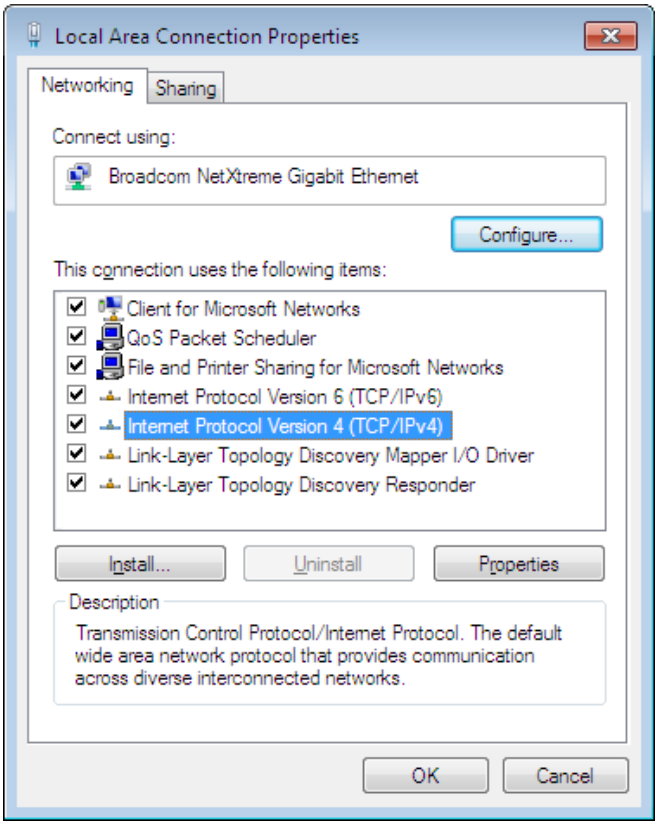
2.8.1 IP Setup for Windows



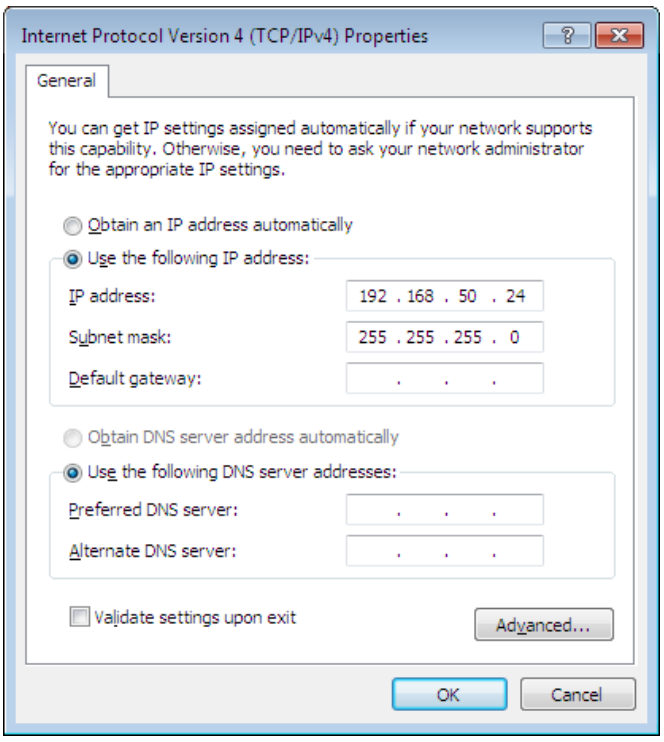
1. Go to: Start -> Control Panel


Control Panel ▸ Network and Internet ▸ Network and Sharing Center
Search Control Panel
Control Panel Home
Change adapter settings
Change advanced sharing settings
View your basic network information and set up connections
See full map
T300-WIN7
(This computer)
Network
Internet
View your active networks
Connect or disconnect
Network
Work network
Access type: Internet
Connections: Local Area Connection
Change your networking settings
Set up a new connection or network
Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.
Connect to a network
Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.
Choose homegroup and sharing options
Access files and printers located on other network computers, or change sharing settings.
Troubleshoot problems
Diagnose and repair network problems, or get troubleshooting information.

2. Navigate to Network and Internet -> Network and Sharing Center



3. Choose Internet Protocol Version 4(TCP/Ipv4) then click Properties button.


Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 50 . 24
Subnet mask: 255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

4. Set Internet Protocol Properties

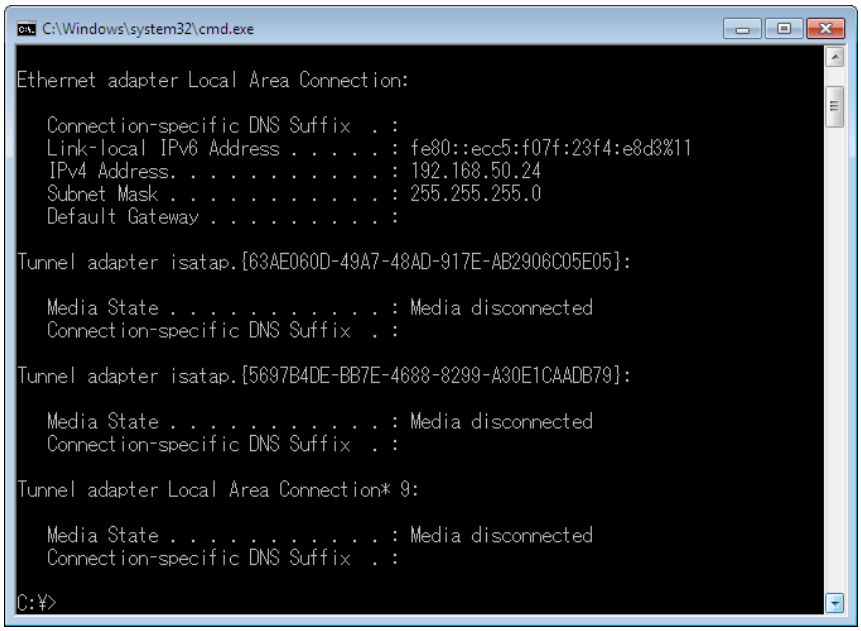
First, check “use the following IO address”. Considering RAID IP ADDRESS is 192.168.50.210 set as follows:

IP address: 192.168.50.XXX (put unused address in place of XXX.)

Subnet mask: 255.255.255.0

Then, click OK button.

- Make sure the IP address used here is not used by another device, or it may not work properly.


C:\Windows\system32\cmd.exe
Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::ecc5:f07f:23f4:e8d3%11
IPv4 Address. . . . . : 192.168.50.24
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
Tunnel adapter isatap.{63AE060D-49A7-48AD-917E-AB2906C05E05}:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Tunnel adapter isatap.{5697B4DE-BB7E-4688-8299-A30E1CAADB79}:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Tunnel adapter Local Area Connection* 9:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
C:¥>

５. Confirming the change

１. Start -> enter “cmd.exe” to open command prompt window.

２. Enter ipconfig /renew ３. Enter ipconfig /all Check if the IP Address has changed correctly.

2.8.2 IP Setup for Linux

１. Open a Terminal Window.

２. Enter # ifconfig eth0 192.168.50.X

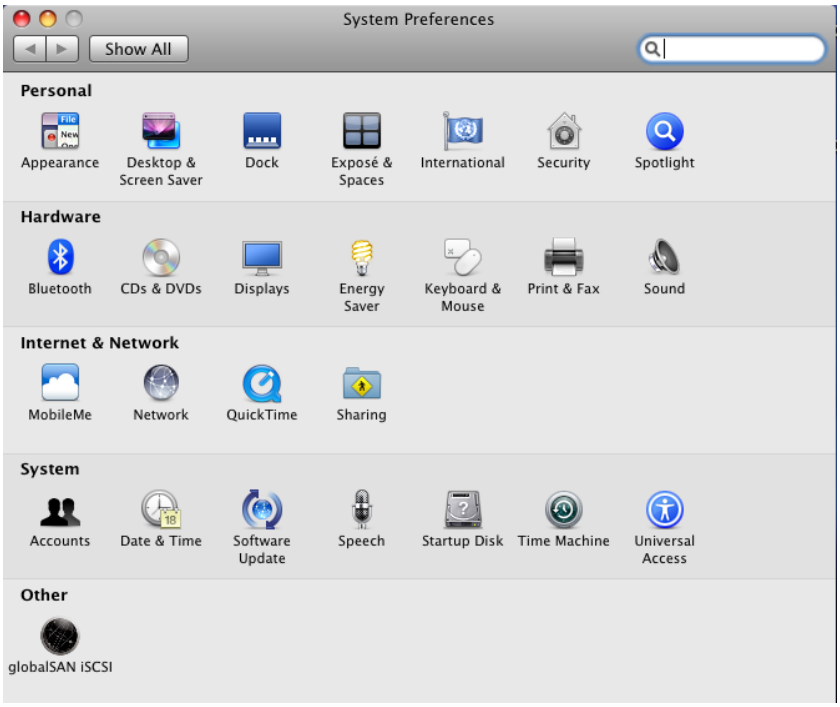
(* Put IP that is not used in the current network in “X”.)

３. Enter $ sudo dhclient then press enter key.

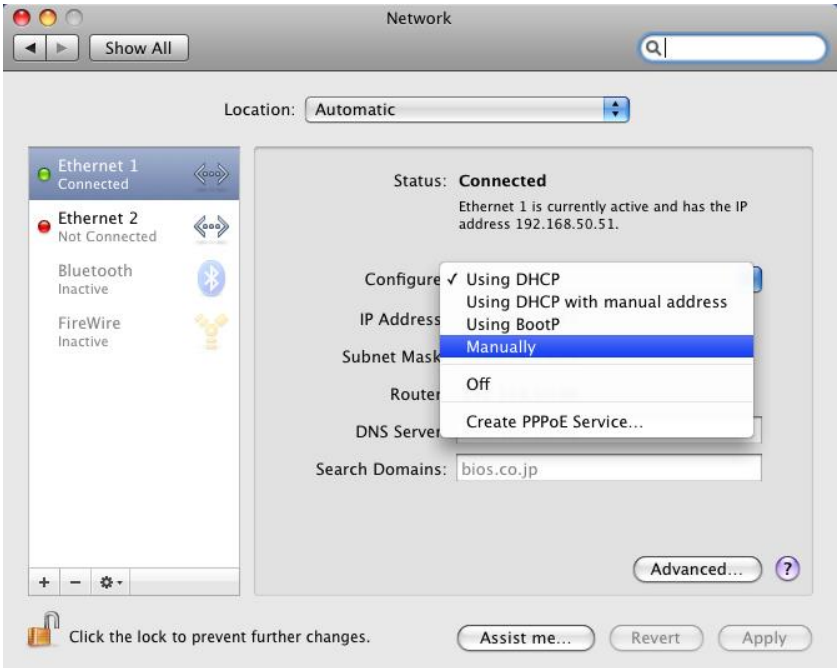
４. Enter #ifconfig to confirm changed IP address

2.8.3 IP Setup for MAC OS X

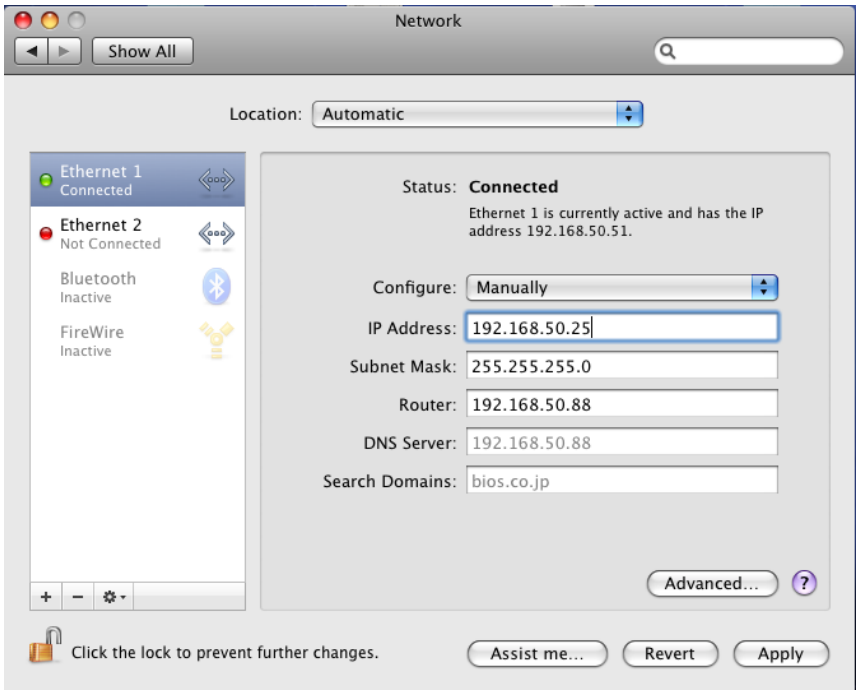
1. Click System Preferences.



2. Click “Network” Icon.



3 . Choose Configure option to Manually.



4 . Enter IP address and click Apply button to save it.

- **Make sure the address used here is not used by another device.**

Chapter 3 Format

3.1 Linux

The section explains how to use with Linux for reference.
Please refer to Linux OS user guide for details.
(Note: Only eSATA and/or USB3 LUNs supported on Linux)

1. Login as Superuser

Handling a disk is privileged function for Superuser only. Please login as a Superuser or a.k.a. “root”.

```
<Host name> login: root
Password: ******

Last login: XXX XXX XX XX:XX:XX

…
…

[root@<Host name> /root]#
```

2. Partition Creation and formatting (fdisk command)

① start fdisk

*Example below is when DVPro T10 is recognized as /dev/sdb

```
[root@sheep /root]# fdisk /dev/sdb
```

② Creating partition

*Example below is when creating one partition takes whole disk spaces

```
Command (m for help): n   (n:fdisk command)
Command action
  e   extended
  p   primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-182399, default 1): 1
Last cylinder or +size or +sizeM or +sizeK (1-182399, default 182399): 182399
```

```
Command (m for help): p   (p:fdisk command)

Disk /dev/sda: 255 heads, 63 sectors, 120130 cylindersUnits = cylinders of 16065 * 512 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1               1      182399  1465119936   83  Linux

Command (m for help): w   (w:fdisk command)
The partition table has been altered!

Calling ioctl( ) to re-read partition table.
Syncing disks.

WARNING: If you have created or modified any DOS 6.x
partitions, please see the fdisk manual page for additional information.
```

3. Formatting partition created (mke2fs command)

```
[root@sheep /root]# mke2fs /dev/sda1
mke2fs 1.29, 24-Sep-2002 for EXT2 FS 0.5b, 95/08/09
Filesystem label=
OS type：Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
183140352 inodes, 366279984 blocks
18313999 blocks (5.00%) reserved for the super user
First data block=0
11178 block groups
32768 blocks per group, 32768 fragments per group
16384 inodes per group
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
    4096000, 7962624, 11239424, 20480000, 23887872, 71663616, 78675968,
    102400000, 214990848

Writing inode tables: done
Writing superblocks and file system accounting information: done
[root@sheep /root]#
```

4. Mounting File system

```
[root@sheep /root]#mount /dev/sdb1 /RAID
```

* “/dev/sdb1” is Device partition you are mounting and “/RAID” is the mount point.

3.2 Windows 7

(Note: Only eSATA and/or USB3 LUNs supported across different Windows platform. Thunderbolt might be able to use on Windows 8.1. Official Thunderbolt support on Windows platform depends on future firmware and driver release.)

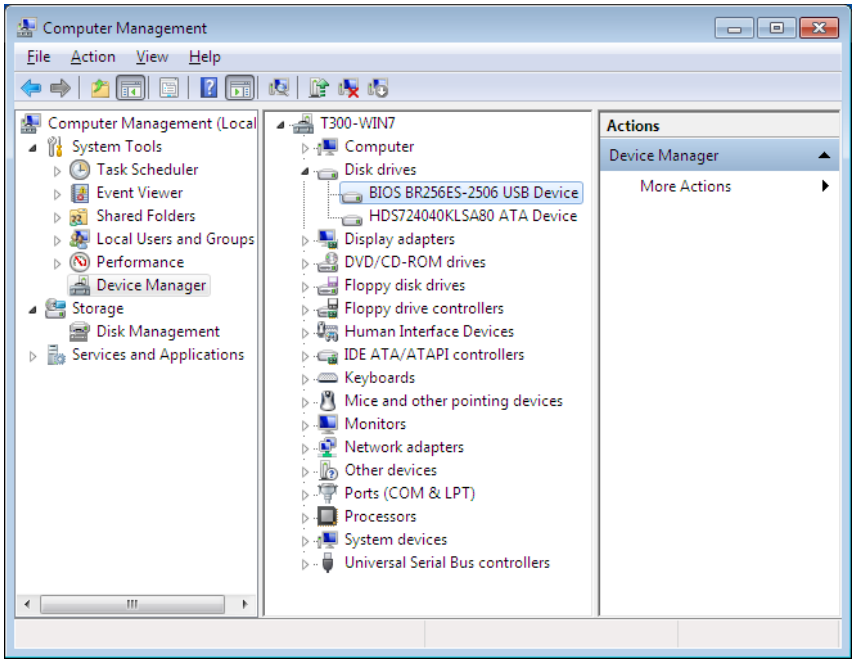
The section explains how to use with Windows 7 for reference.
Please refer to Windows 7 user guide for details.

1. Confirm the connection

① Connect and power on DVPro T10 then starts with host computer.

② Press the Start Button and right-click on “Computer”. Click on “Manage”.

③ Go to “Device Manager”. Click on Disk Drives and confirm that the DVPro T10 has been registered.

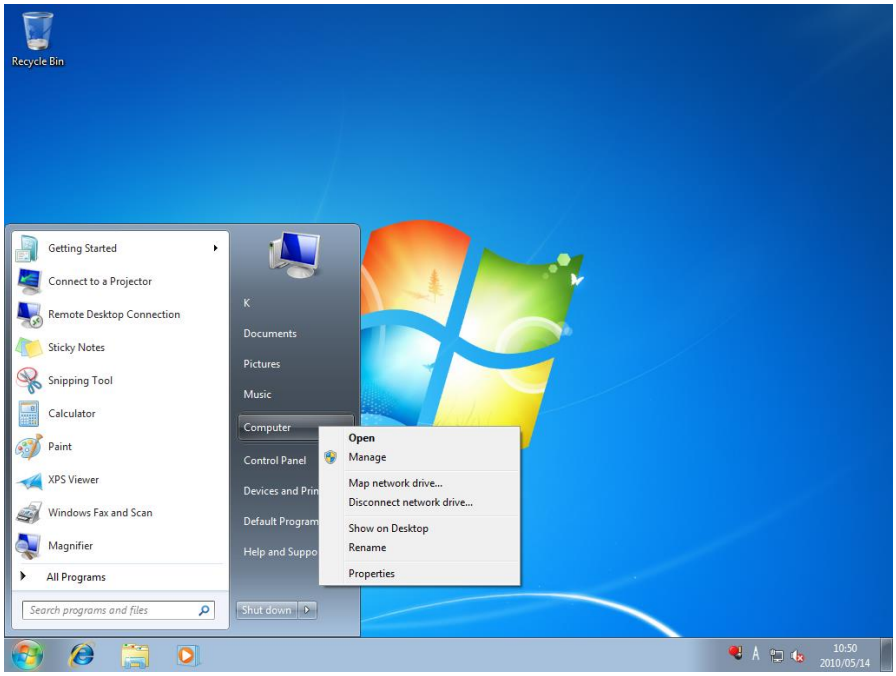


※ If you did not see DVPro T10 here, please check below

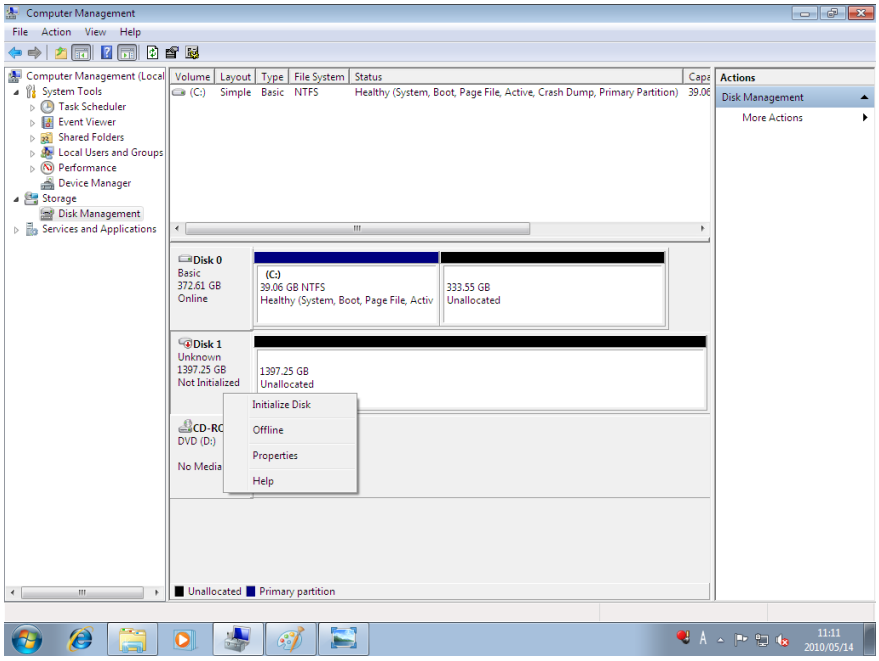
- Is the host HBA recognized by OS or not? （Please consult with your HBA vendor if not）
- Was DVPro T10 normally started and connected?

2. Partition Creation and Formatting

1. Log into Windows 7 and click the Start, then right click on “Computer” and click on “Manage”

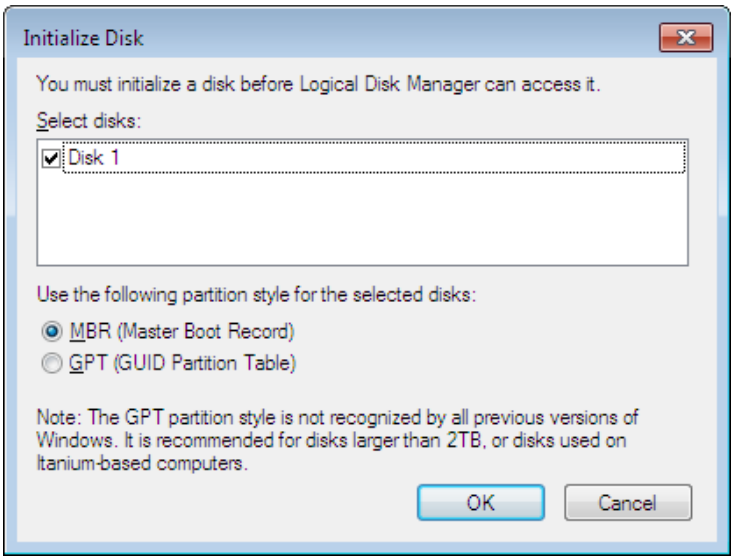


2. Click on “Computer Management” -> “Storage” -> “Disk Management”

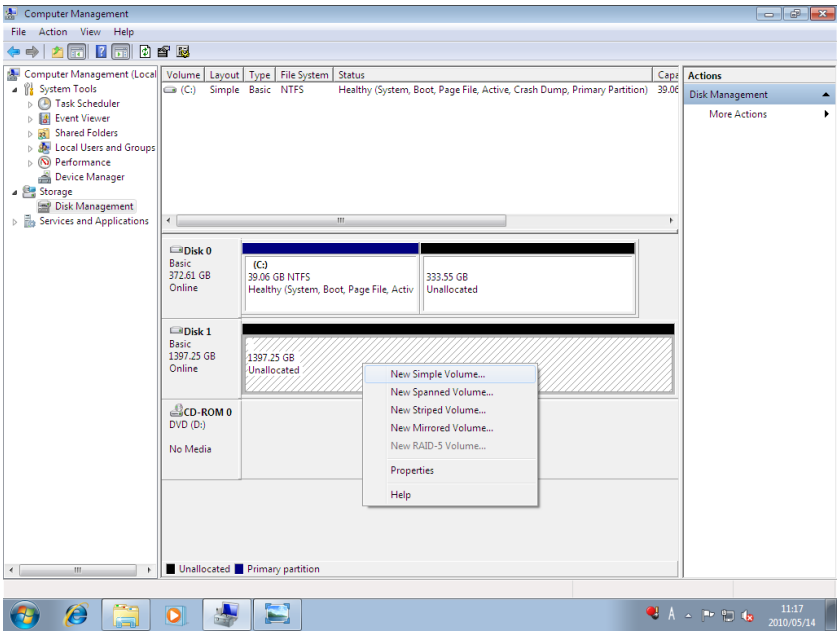


3. Right click Not initialize disk(DISK1)then click「Initialize Disk」.

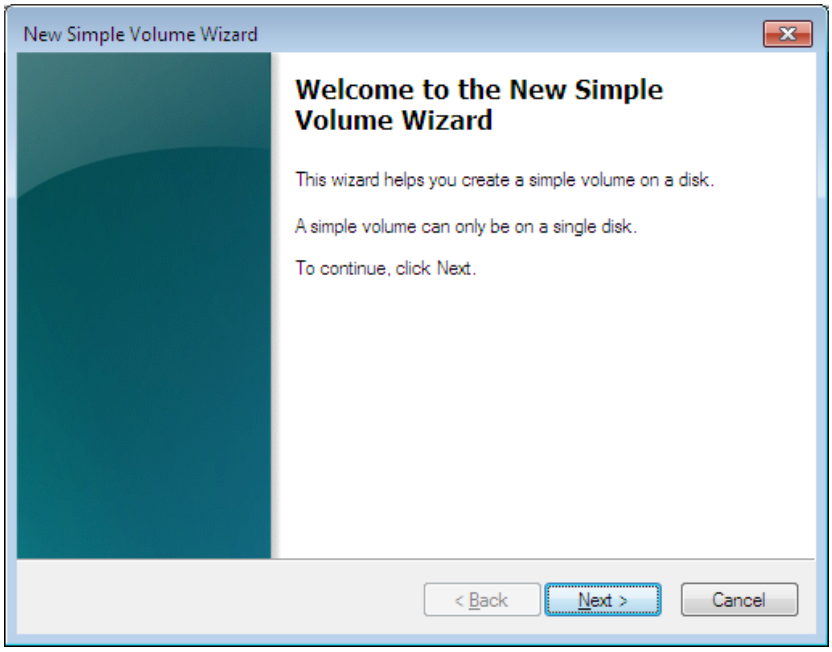
4. Check the disk to be initialized and move on to the formatting.(If DVPro T10 has capacity over 2TB in Volume then choose GPT Disk label here to able to use disk over 2TB.)


Initialize Disk
You must initialize a disk before Logical Disk Manager can access it.
Select disks:
Disk 1
Use the following partition style for the selected disks:
MBR (Master Boot Record)
GPT (GUID Partition Table)
Note: The GPT partition style is not recognized by all previous versions of Windows. It is recommended for disks larger than 2TB, or disks used on Itanium-based computers.
OK
Cancel

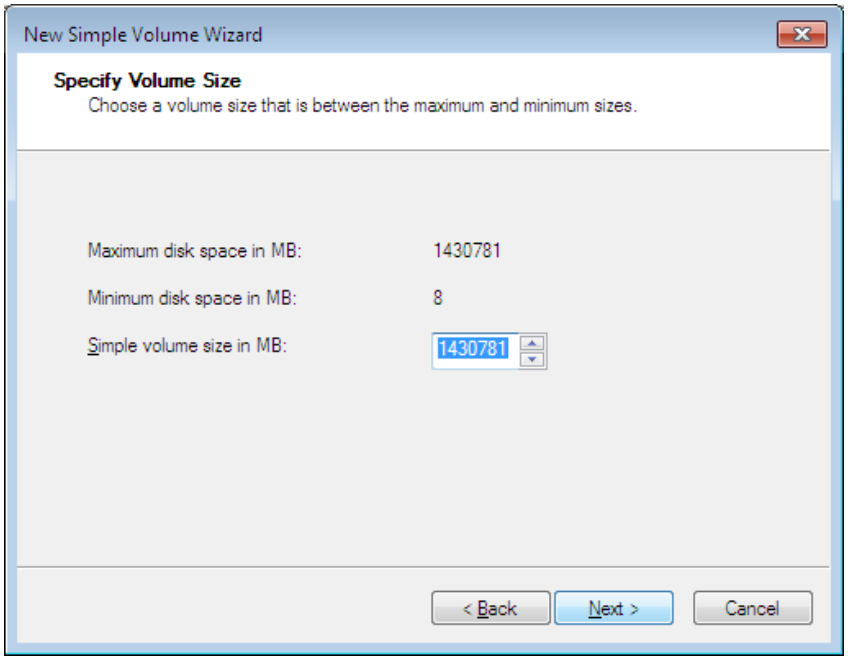
5. Right click on the disk you wish to edit and click “New Simple Volume”



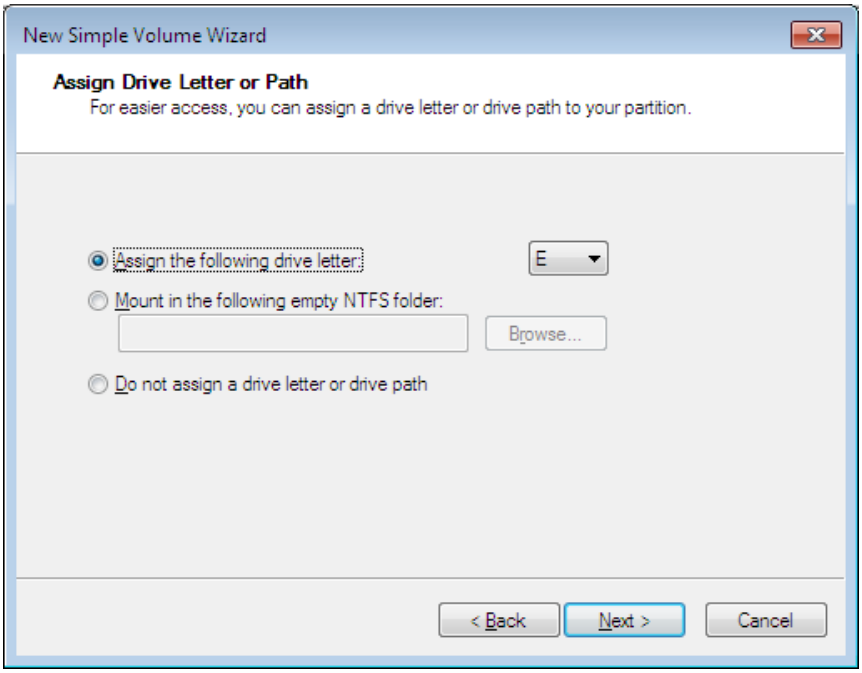
6. The New Volume Wizard will load up, so click “Next”


New Simple Volume Wizard
Welcome to the New Simple Volume Wizard
This wizard helps you create a simple volume on a disk.
A simple volume can only be on a single disk.
To continue, click Next.
< Back
Next >
Cancel

7. Choose the volume you want, then click “Next”.



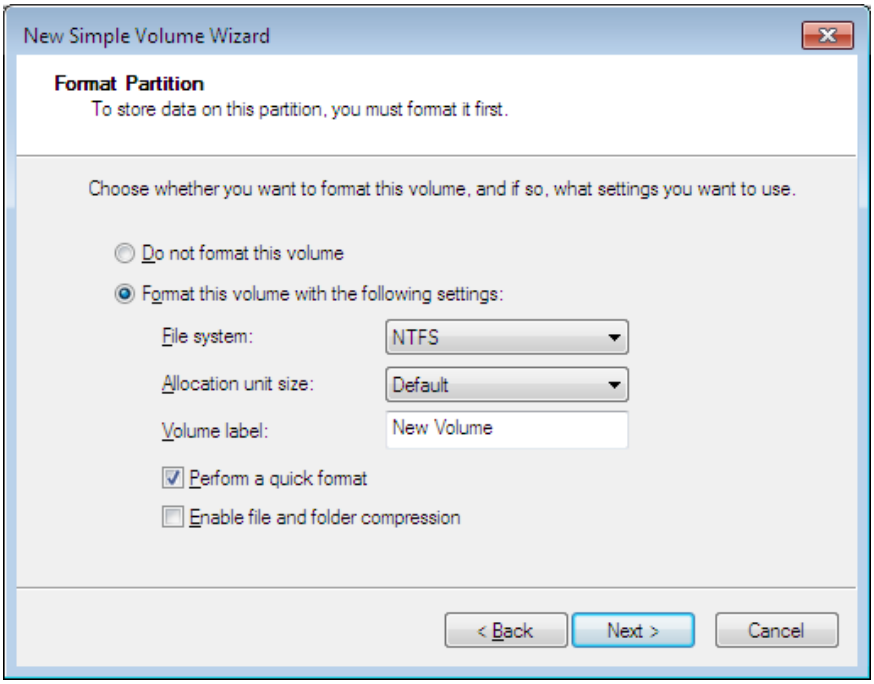
8. Choose the driver letter you wish, click “Next”,


New Simple Volume Wizard
Assign Drive Letter or Path
For easier access, you can assign a drive letter or drive path to your partition.
Assign the following drive letter:
E
Mount in the following empty NTFS folder:
Browse...
Do not assign a drive letter or drive path
< Back
Next >
Cancel

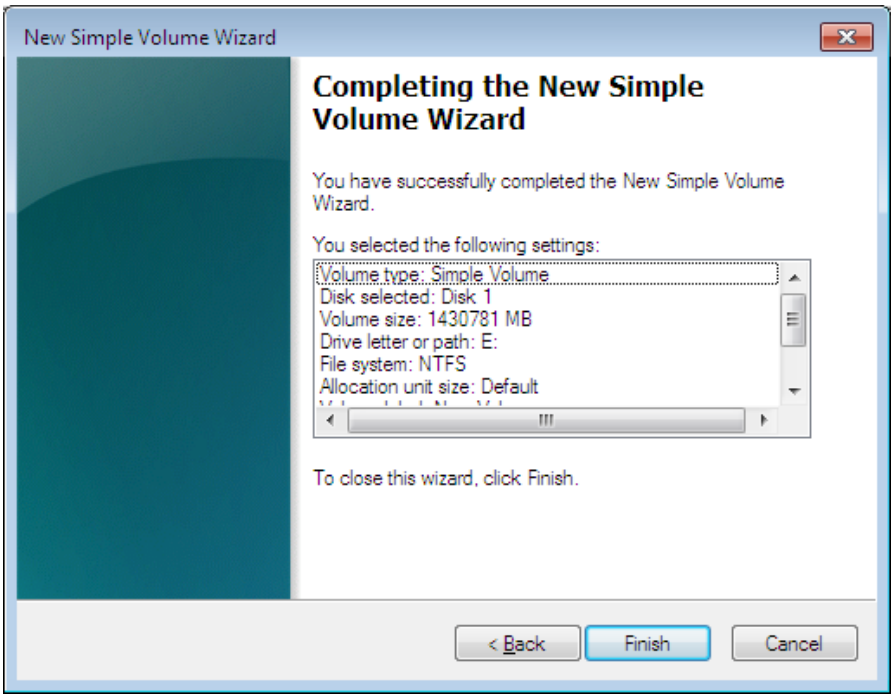
9. Choose the proper formatting settings and

To change allocation unit size from default to 16K is recommended for better performance.

Click “Next” again.


New Simple Volume Wizard
Format Partition
To store data on this partition, you must format it first.
Choose whether you want to format this volume, and if so, what settings you want to use.
Do not format this volume
Format this volume with the following settings:
File system:
NTFS
Allocation unit size:
Default
Volume label:
New Volume
Perform a quick format
Enable file and folder compression
< Back
Next >
Cancel

10. When you've verified that the settings are correct and there are no errors, click "Finish".


New Simple Volume Wizard
Completing the New Simple Volume Wizard
You have successfully completed the New Simple Volume Wizard.
You selected the following settings:
Volume type: Simple Volume
Disk selected: Disk 1
Volume size: 1430781 MB
Drive letter or path: E:
File system: NTFS
Allocation unit size: Default
To close this wizard, click Finish.
< Back
Finish
Cancel

11. The format will begin.
    Close the "Computer Management" after the format has completed.

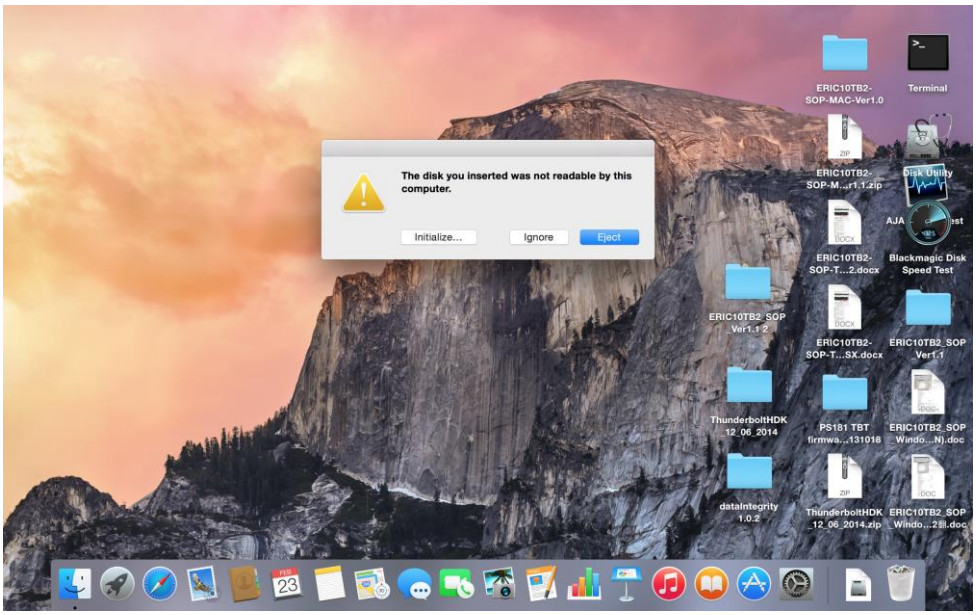
※ You can use the disk now, please remember the disk name you made

3.3 Mac OS® X

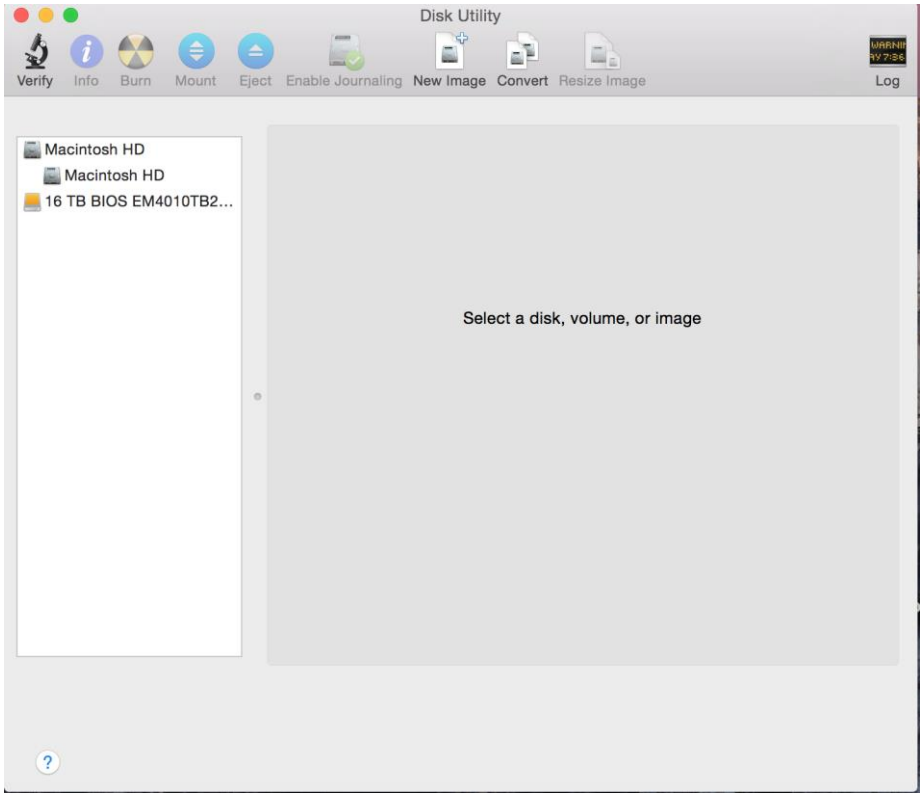
The section explains how to use with Mac OS X with Thunderbolt connection for reference.
Please refer to Mac OS X user guide for details.

1. Confirm the connection

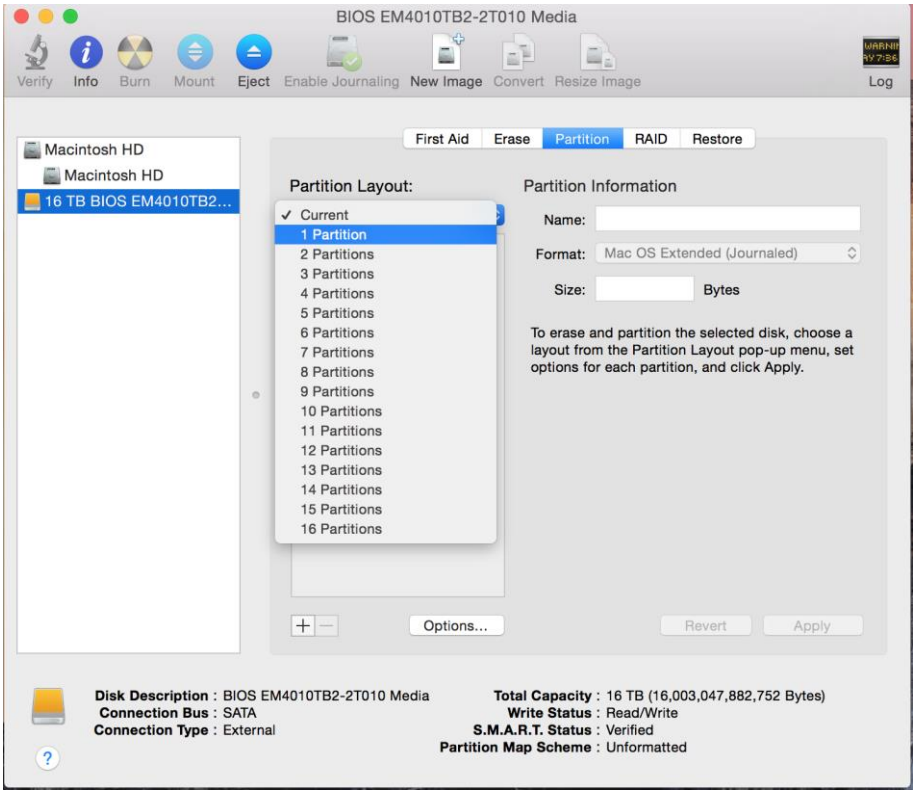
Connect Thunderbolt cable between the device and Mac computer. Power on DVPro first and then power on Mac computer. If connection is fine, the disk detection window will be popped up as below.



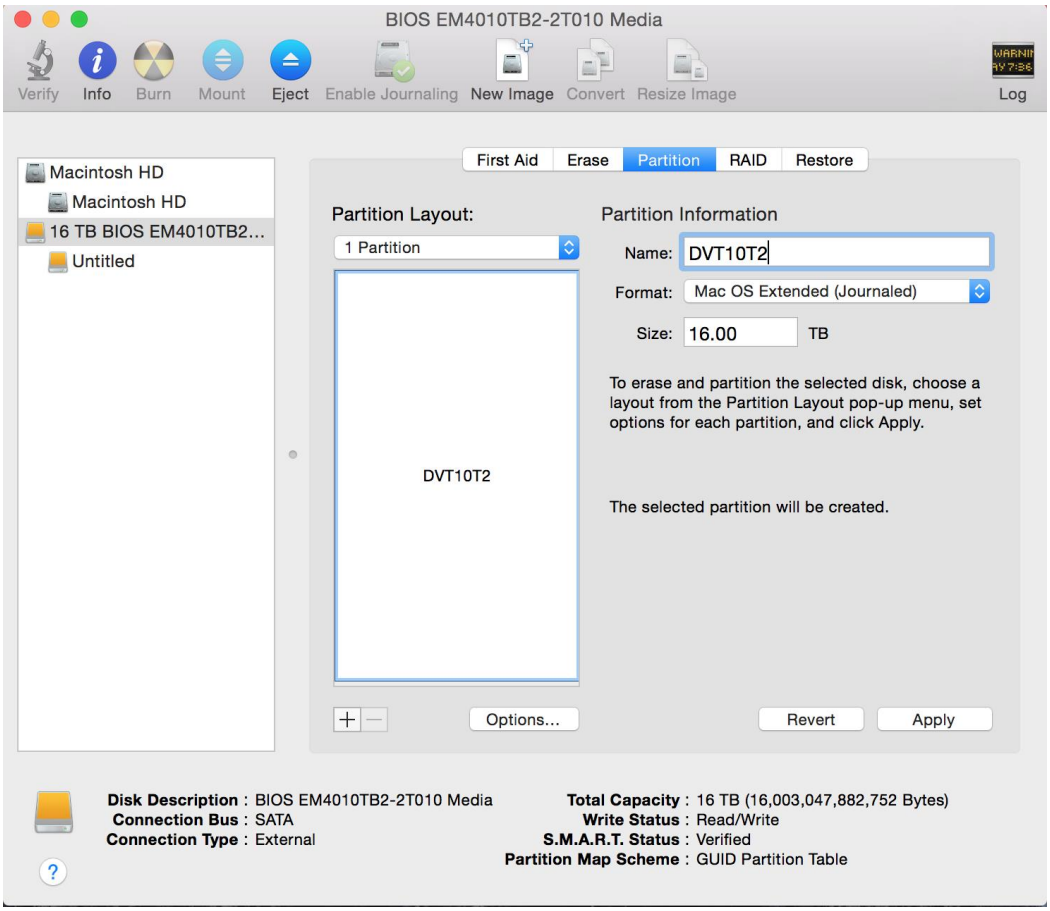
2. Click on Initialize button to launch Disk Utility for disk partition and initialization



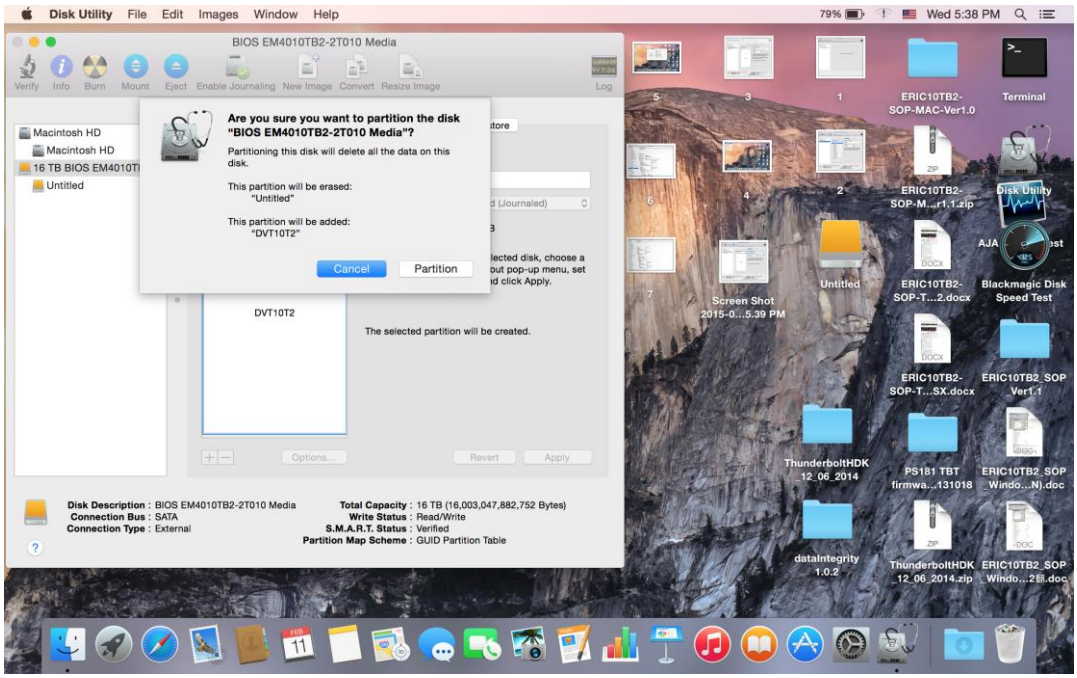
3. Choose the disk to initialize (eg. 16 TB BIOS) and click on Partition tab
Click Partition Layout to set number of partitions you want



4. Input Partition Information as needed

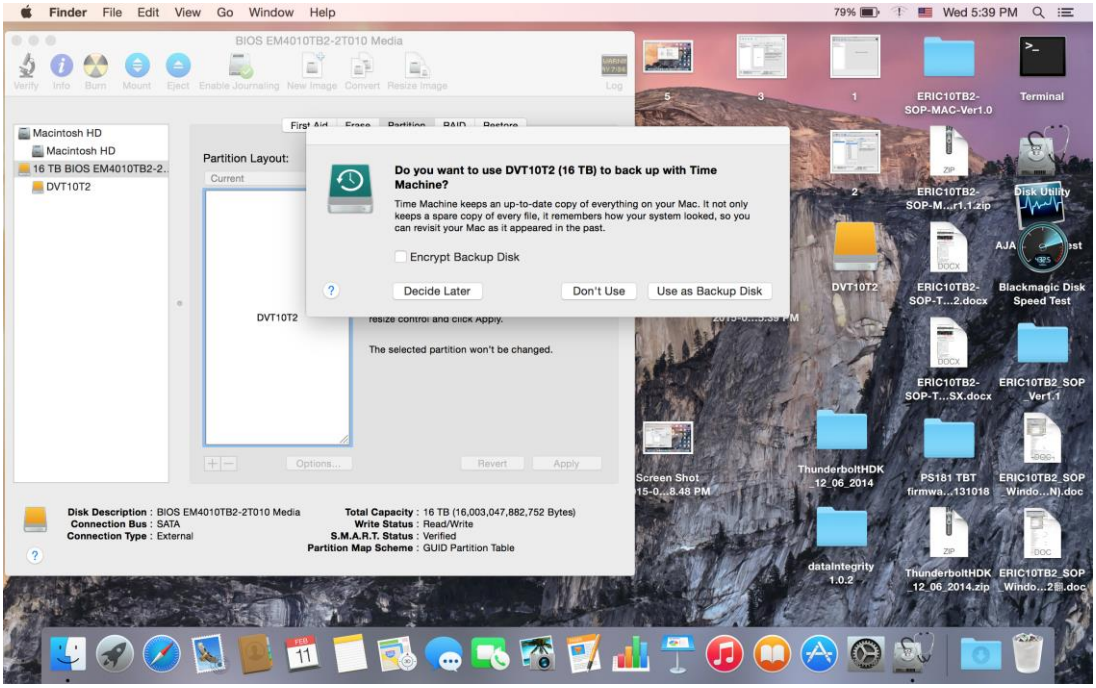


5. Apply partition and confirm Partition

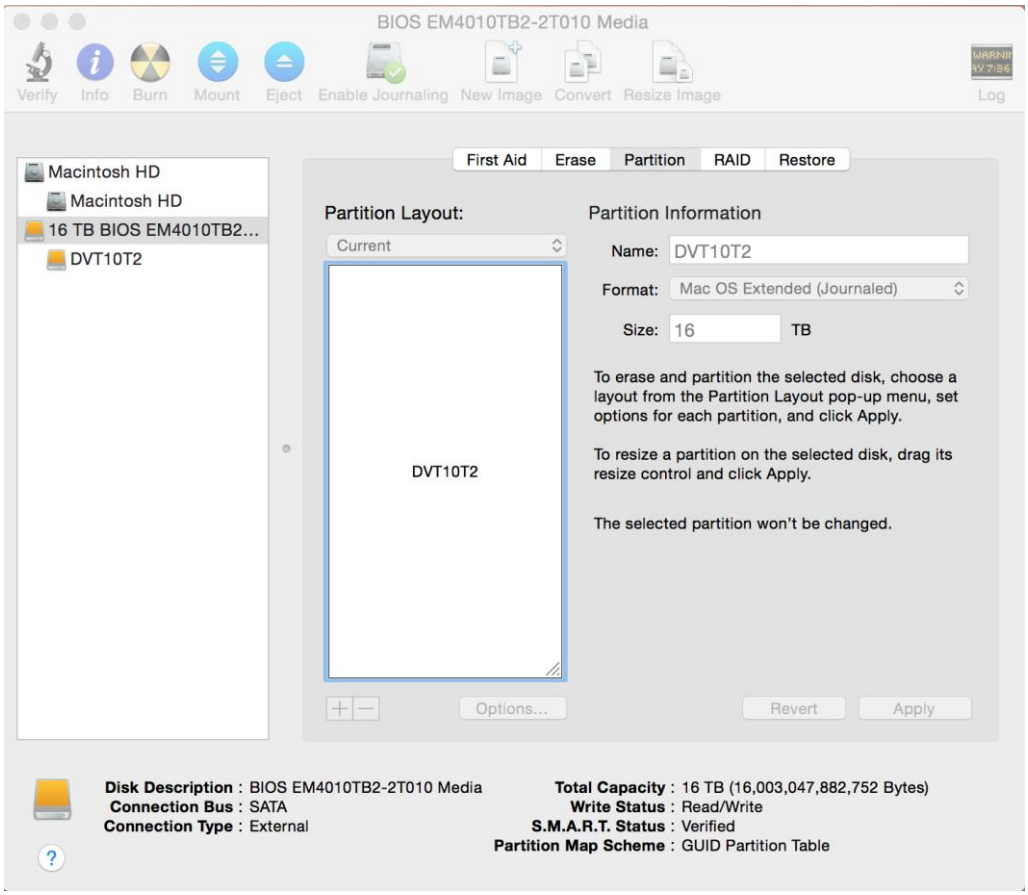

Disk Utility File Edit Images Window Help
BIOS EM4010TB2-2T010 Media
Are you sure you want to partition the disk "BIOS EM4010TB2-2T010 Media"?
Partitioning this disk will delete all the data on this disk.
This partition will be erased:
"Untitled"
This partition will be added:
"DVT10T2"
Cancel
Partition
DVT10T2
The selected partition will be created.
Disk Description : BIOS EM4010TB2-2T010 Media
Connection Bus : SATA
Connection Type : External
Total Capacity : 16 TB (16,003,047,882,752 Bytes)
Write Status : Read/Write
S.M.A.R.T. Status : Verified
Partition Map Scheme : GUID Partition Table

6. Choose between Backup disk or not

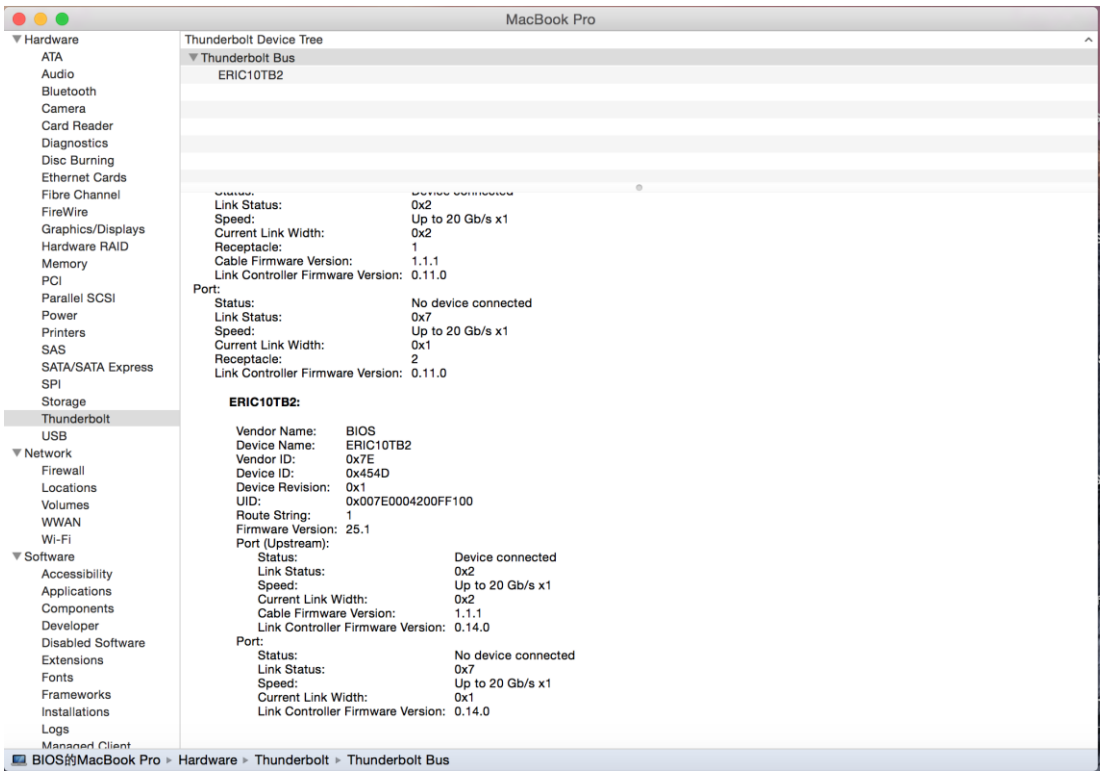
Upon completion of partition, the disk can be used to back up with Time Machine or decide later


Finder File Edit View Go Window Help
BIOS EM4010TB2-2T010 Media
Partition Layout:
Do you want to use DVT10T2 (16 TB) to back up with Time Machine?
Time Machine keeps an up-to-date copy of everything on your Mac. It not only keeps a spare copy of every file, it remembers how your system looked, so you can revisit your Mac as it appeared in the past.
Encrypt Backup Disk
Decide Later
Don't Use
Use as Backup Disk
DVT10T2
The selected partition won't be changed.
Disk Description : BIOS EM4010TB2-2T010 Media
Connection Bus : SATA
Connection Type : External
Total Capacity : 16 TB (16,003,047,882,752 Bytes)
Write Status : Read/Write
S.M.A.R.T. Status : Verified
Partition Map Scheme : GUID Partition Table

7. Partition Completion



You can check Thunderbolt link status and vendor information on System Report>Hardware>Thunderbolt



Here for example, the Upstream link speed of the device is 20Gb/s which means Thunderbolt2 connection.

Appendix A - MBR of different Operating Systems

Since first LBA of LUN partition is not always aligned with data buffer size, an unaligned LUN might impact the performance of data access. Especially this happens on earlier Windows Operating Systems. In LUN MODE setup parameter; there is different offset option to adjust the alignment at LUN creation. Please refer to below table for different combinations.

OS	MBR		GPT		Note
	First LBA	Alignment	First LBA	Alignment	
Win7x64	206848	○	264192	○	
Win7x86	206848	○	264192	○	
WS2008R2	206848	○	264192	○	
VistaSP1x86	2048	○	264192	○	
VistaSP1x64	2048	○	264192	○	
WS2008x86	2048	○	264192	○	
WS2008x64	2048	○	264192	○	
WS2003R2x86	63	×	262178	×	MBR: MBR(+1) GPT: MBR(-2)
WS2003R2x64	63	×	262178	×	MBR: MBR(+1) GPT: MBR(-2)
WinXPx86	63	×	N/A	×	MBR: MBR(+1)
WinXPx64	63	×	262178	×	MBR: MBR(+1) GPT: MBR(-2)

○: Aligned
X : Need Alignment

Appendix B – Error Message shown on LCD

Category	LCD Text	Meaning	Notes
Drive Error	RAID-x ONE DRIVE DOWN	One drive down and host accessible status	To know exactly which drive is down, please look up Drive Fault LED on system front panel. Press SELECT can also see which drive is down
	RAID-6 TWO DRIVE DOWN	Two drives down and host accessible status	Same as above
	SYSTEM DOWN	System not reliable anymore due to multiple driver down	Same as above. Press MODE button to mute buzzer
	RAID-10 MULTIPLE DOWN	Multiple drives down and host accessible status	
	Most Delay Channel x	X is empty if there is no delay channel	
	CH x RCV in PTR yyyyyyyyyyyyyyy	Drive x is recovered by rewrite at Patrol scan on LBA yyyyyy..	
Enclosure Error	FANx STOP NORMAL	Fan x stopped and host accessible	Check user manual to know which fan is failed. Press MODE button to mute buzzer
	FANx OVERFLOW	Fan x speed is >90,000RPM	
	ALL FAN STOP NORMAL	All fans stopped and host accessible	
	PSx DOWN NORMAL	Power Supply x failed and host accessible	Only for redundant PSU
	All POWER DOWN NORMAL	All Power modules failed and host accessible	
Controller Error	Dispatch Nesting Error	Error occurred at starting dispatch function in dispatch routine	Host access is disconnected upon all Controller errors. Contact support for necessary actions.
	Code ROM Error System Halted	Flash EPROM check sum error System halted	Usually happened on power on
	Work RAM Error System Halted	Working area DRAM error System halted	
	Divide or FPP or Invalid Code Err	A zero denominator error	
	SYSTEM INTERRUPT Error	Error not defined specifically	
	SYSTEM SBI INT Occur	System break error	
	SYSTEM RIE INT：0x000	Exception error occurred on scheduled command	
	SYSTEM AE INT：0x000	Address exception error	

	SYSTEM TRAP Error	Undefined Trap process error	
Cache Memory Error	Buffer Manager Queue Error	Cache buffer manager error	Host access is disconnected upon all Cache errors. Contact support for necessary actions.
	Cache Buffer Error 0x########	Access error while cache buffer check	
	Buffer Size Error	Data inconsistent while cache buffer check	
	Buffer Manager Link Error	Cache buffer manager error	

Extra error code shown on **ONE DOWN/SYSTEM DOWN (Drive error)**

Hardware Error

r	IDE register read / write
A	disk dma time out ? no pend in exe auto
B	bad block detected
C	uncorrectable error detected
D	data transfer requested
E	IDE drive busy in start
I	ID not found
M	data address mark not found
N	Disk Time out in write sequence
O	command aborted
p	Time out to data shortage
R	IDE drive ready time out
S	unable to find track 0
T	(dummy)busy time out or so
Y	disk not present in write
Z	Not Ready in Command
z	other error
L	capacity error
W	Disk Not Ready in command begins
X	disk not present in operation without write

Software Error

U	undefined command error
E	chip busy soft error

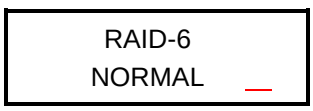
※When 「S」or「Z」or「z」is appended, there is high possibility that drive is failed. Please contact technical support before taking any action.

Extra information for Retry detection and Drive SENSE DATA

A Retry mark will be displayed when retry was occurred.

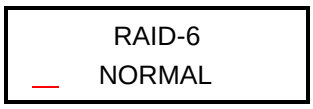
Although DVPro T10 is designed to isolate a failed drive to avoid data corruption, it is necessary to check drive for permanent failure or occasional failure by several retries on Write or Read.

A Retry mark can be seen on “RAID-x Normal“ display if retries were performed. While controller is at normal operation, press MODE and SELECT button will allow you to check and clear the retry mark.



The retry mark is shown after “NORMAL” case

- G – Host write data transmission error
- P – Host bus parity error before data out process ending
- Q – Host bus parity error in middle of data out process
- R – Host bus parity error on data in phase
- I – Sequencer interrupt on Initiator error
- : – Data out transmission error detected abortion of condition check
- . – Data write recovered by retry
- ; — Read error occurred on parity generation read operation. Recovery was taken

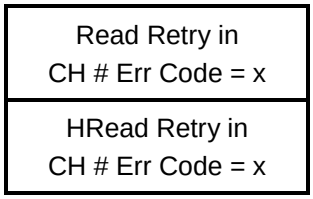


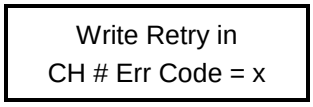
The retry mark is shown in front of “NORMAL” case.

: – Data in transmission error detected abortion of condition check
. – Data read recovered by retry
! – Data read recovered by Rewrite and Read
? – Retry on Patrol operation

How to use MODE and SELECT button

While at READ or WRITE operation, if Retry is occurred (Drive access retry), press SELECT button to bring up retry details

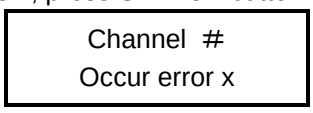




CH 0	Drive No. 0
CH 1	Drive No. 1
CH 2	Drive No. 2
CH 3	Drive No. 3
CH 4	Drive No. 4

CH 5	Drive No. 5
CH 6	Drive No. 6
CH 7	Drive No. 7
CH 8	Drive No. 8
CH 9	Drive No. 9

If there is a Drive down error on LCD, press SELECT button to see extra error information.



「#」drive number, 「x」drive fault reason

Pressing MODE+SELECT twice will clear retry mark but extra error information will be shown. If same error occurred twice or more, then the drive or host is considered as problematic.